

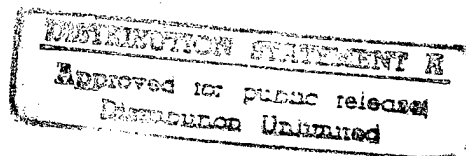
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# USSR Report

AGRICULTURE



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6 February 1986

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## LIVESTOCK

### LIVESTOCK RAISING, RESULTS TIED TO SCIENCE, COOPERATION

Kiev SILSKI VISTI in Ukrainian 23 Jun 85 p 2

[Article by A. Belen and G. Senkevych, SILSKI VISIT special correspondents: "Livestock Raising: Science and Practice in Close Cooperation: Notes from the Applied Scientific Conference on Problems Concerning Strengthening the Development of Communal Livestock Raising on the Basis of Scientific-Technical Progress"]

[Text] The Shramkovka inter-farm enterprise for the fattening of meat cattle on sugar beet scraps is less than 10 years old. But the experience of its collective has already been studied with interest for quite some time and not only in the Cherkassy area. Here the production of beef is being systematically increased and the farm's economic indicators are improving substantially. For instance, almost 11,000 head of cattle were fattened at the enterprise last year. The average daily increase in the weight of one animal reached 1,136 grams and the average delivery weight reached almost 440 kilograms. Thanks to improvement in feeding of livestock, based on the scientific studies of the collective of the UkrSSR Scientific Research Institute of Livestock Raising in the Forest-Steppe Regions and Forest Lands, the expenditure of feeds for a quintal of added growth decreased to 7 quintals of feed units, and expenditure of concentrates decreased to 2 quintals. Due to the wide implementation of mechanization, the labor intensity per unit of production has been sharply reduced. As a result, the cost of a quintal of increased weight last year was scarcely higher than 90 rubles, while the return upon sale was more than two times higher.

This is only one of many instances of the fruitful collaboration of practice with science. But it adequately demonstrates the substance of those complex processes that are occurring of late in communal livestock raising in Cherkassy Oblast. Skillful and well thought-out monitoring of these processes enables local cattle raisers to attain even greater stability in all branch sectors, and under any circumstances. And this stability is presently widely known.

AFTER 4 YEARS OF THE 11TH 5-YEAR PLAN, THE AVERAGE ANNUAL PROCUREMENT OF MEAT IN FARMS OF THE CHERKASSY AREA HAS INCREASED IN COMPARISON WITH THE LAST YEAR OF THE PREVIOUS PLAN BY 28 PERCENT, AND THE PROCUREMENT OF MILK BY 26 PERCENT. THE AMOUNT OF MILK DRAWN AT ONE MILKING PER COW ROSE BY NEARLY 500 KILOGRAMS. IT IS CALCULATED THAT FOR EACH 100 HECTARES OF AGRICULTURAL LAND 580 QUINTALS OF MILK AND 150 QUINTALS OF MEAT ARE PRODUCED.

The production and sale of farm products is also increasing this year.

Calculations attest that THE POSSIBILITIES FOR INCREASING THE OUTPUT OF THE PRODUCTS OF LIVESTOCK RAISING ARE STILL NOT BEING COMPLETELY UTILIZED BY KOLKHOZES AND SOVKHOZES OF THE OBLAST. Presently, for every 100 hectares here, 70 head of meat cattle are maintained, among them up to 20 cows, and also up to 70 head of pigs. With such a quantity of livestock it is possible to produce not less than 200 quintals of meat and 680 of milk for every 100 hectares. Because, for instance, the farms of the Cherkassy Rayon already in the past year have obtained figures of 280 and close to 800 quintals, respectively. Livestock raisers in some other rayons had showings that were not much lower. But there are also quite a few farms in the oblast where for each 100 hectares 500 quintals of milk and 100 quintals of meat are produced. There is one reason for such diversity--the varying productivity of cattle and the dissimilar approach of managers and specialists to the business at hand. Where the farming is creative, managers broadly and courageously rely upon the latest achievements of science and advanced practice, and the results are good. Where they still continue to look to yesterday--they mark time and in the end begin to unjustifiably fall behind.

Thus, it is not by accident that AT THE OBLAST APPLIED SCIENTIFIC CONFERENCE ON QUESTIONS OF THE STRENGTHENED DEVELOPMENT OF LIVESTOCK RAISING, which took place in the oblast with the assistance of a wide circle of republic scientists, the PRINCIPLE ATTENTION WAS FOCUSED PRECISELY ON UNREALIZED POSSIBILITIES. Thoughts on the need to bring into operation all of the branch's strengths were the leading subject in both the report of I. K. Lutak, first secretary of the oblast party committee, and in all presentations.

For example, THE PRODUCTION OF MEAT--ONE OF THE CHIEF TASKS OF THE FOOD PROGRAM. THE RESOLUTION OF THIS VITALLY IMPORTANT PROBLEM ON OBLAST FARMS IS CONNECTED, FIRST OF ALL, WITH A FURTHER INCREASE IN THE PRODUCTION OF BEEF. This is determined primarily by the specialization of agriculture and by the structure of the feed balance. Much has been done here in the last few years to put the branch on an industrial track. Broad specializations and concentration have been realized, a network of inter-farm enterprises concerned with the fattening of meat cattle has been created, and their material base has been strengthened. In the present 5-year plan alone, quarters for 20,000 stalls for the raising of calves from the tenth twenty-day-period have been erected on farms, and quarters for 5,000 stalls for the fattening of livestock have been erected on inter-farm enterprises. Presently working in a unified technological chain are practically all the dairy farms, close to 40 specialized farms concerned with the raising of young stock to from 340 to 350 kilograms, and 21 inter-kolkhoz enterprises concerned with the final intensive fattening of cattle on sugar beet scrap, where an average daily weight gain of a kilogram and more is achieved for each head. THE OBLAST'S MASTERING OF THE FLOW LINE TECHNOLOGY OF BEEF PRODUCTION PROVIDES THE OPPORTUNITY TO MOST COMPLETELY UTILIZE THE BIOLOGICAL POSSIBILITIES OF THE CATTLE AND FEEDS, TO SHORTEN THE TIME FOR GROWTH AND FATTENING, AND TO DISPATCH ONLY THE BEST CATTLE FOR MEAT. It is no accident that in the last 10 years the production of beef by oblast farms has grown 1.7 times, and a portion of the oblast has exceeded a 56 percent increase of meat in fattening.

However, the advantage of flow line technology in the production of beef is not uniformly being taken advantage of in the rayons of the oblast. If, for instance, on the Shramkovka inter-farm enterprise they obtained an estimated 350 kilograms of increased growth per stall last year, then on the Umanskyy and Katerinopolskyy only from 250 to 262 kilograms was obtained. This occurred because there is still only little room set aside for the raising of calves up to the 9-month stage in a number of rayons. It is proven scientifically and in practice: during normal development the daily average increase in the weight of calves up to the 3-month stage should be not less than 700 to 750 grams, and up to the 6-month stage--800 to 830 grams. At the half year stage the calf must weigh at the minimum 160 to 170 kilograms, then at 15 months it may be put on the final fattening, where the animals reach a weight of more than 350 kilograms. If these technological requirements are not adhered to, the animal loses the momentum of growth and matters can not be corrected during final fattening. Consequently, the time for fattening the animal is prolonged from 20 to 22 months, so that, as a result, there is significant overexpenditure on feeds and work and, in the final result, this leads to an increased expense in production.

In the oblast there is experience in achieving normative average daily weight gain in young stock. For instance, scientifically-based feeding of calves is being conducted in the kolkhoz imeni Kuybyshev of the Chigirinskyy Rayon. Thus, after the 3-month stage, animals still get first-stage feed during the course of 2 more months, where a significant role is played by milk substitutes and special mixed feeds. At the same time, from an early stage, they are made accustomed to eating coarse and succulent feeds. The full replacement of the feed ration is carried out only in the 5th month of growth. And this experience has also not received sufficient expansion on the oblast's specialized farms.

THAT IS WHY PRESENTLY THE CHIEF PREOCCUPATION IN THE PRODUCTION OF BEEF IS CONSIDERED BY LIVESTOCK RAISERS OF THE OBLAST TO BE THE SUBSTANTIAL IMPROVEMENT IN THE RAISING OF YOUNG STOCK, AND THE IMPROVEMENT OF TIES BETWEEN THE SPECIALIZED FARMS AND INTER-FARM ENTERPRISES. The task consists of the following: ON THE BASIS OF THE CONTINUED MASTERING OF THE FLOW LINE TECHNOLOGY OF BEEF PRODUCTION, TO MAKE EFFORTS TO OBTAIN ON INTER-FARM ENTERPRISES FATTENING OF NOT LESS THAN 75 PERCENT OF ALL THE DELIVERED YOUNG MEAT CATTLE STOCK. To this time, in a number of rayons only a third are fattened up.

Calculations attest: only because of the low increase in growth of animals in fattening on non-specialized farms, the oblast agro-industrial complex was short the standard gross weight increase by a fourth. It is necessary to drive up the delivery weight of cattle on specialized farms to from 440 to 450 kilograms, and to sell it at over and above 90 percent higher than the average fattened condition. And to strive for this, as was repeatedly emphasized at the conference, is possible only through close and continual cooperation with science, as is demanded by the resolutions of the April 1985 Plenum of the CPSU Central Committee and by the materials of the Council on Questions of the Acceleration of Scientific-Technical Progress.

THE VOLUME OF PORK PRODUCTION IN THE OBLAST MUST INCREASE BY 36 PERCENT DURING THE COURSE OF THE NEXT 5-YEAR PLAN. There is a sufficient material-technological base for this on farms. In the process of specialization, two types of farms were formed: complexes for the production of pork with a closed cycle, and livestock-fattening kolkhozes that use the services of breeding farms. The specific weight of specialized farms in the general volume of pork production exceeds 60 percent.

However, the high genetic potential of hog livestock on oblast farms, it was indicated at the conference, is still being insufficiently utilized. Last year, for instance, only 64 kilograms of pork was produced per processed head. The breeding of the herd needs improvement: only 5.3 head of piglets were obtained for each mated sow. Their increase in growth is low, especially up to the 2-month stage. Meanwhile, LIVESTOCK RAISERS OF THE OBLAST HAVE REAL POSSIBILITIES, ON THE BASIS OF A WIDE IMPLEMENTATION OF THE ACHIEVEMENTS OF ADVANCED PRACTICE, SCIENTIFIC STUDIES, AND IMPROVEMENT IN FEED PRODUCTION, TO INCREASE THE PRODUCTION OF PORK BY UP TO AN ESTIMATED 100 KILOGRAMS PER PROCESSED HEAD. THIS SORT OF LIVESTOCK PRODUCTIVITY WILL PROVIDE THE OPPORTUNITY TO SUCCESSFULLY ATTAIN THE PLANNED LEVEL OF PRODUCTION VOLUME AND DELIVERY OF PORK WHICH ARE OUTLINED FOR THE NEAREST YEARS.

Last year, oblast farms produced almost 26 percent more milk than in the last year of the previous 5-year plan. More than an 80 percent addition was obtained due to the increase in the productivity of the milk-giving herd. The volume of milk production in farms of Cherkassy, Chigirinskyy and Zolotonoshskyy rayons increased by almost a third. IN THE KOLKHOZES AND SOVKHOZES OF THE CHERKASSY RAYON, AN AVERAGE OF 3,669 KILOGRAMS OF MILK WAS OBTAINED PER COW. IN THE NEAR FUTURE THE RAYON WILL REACH 4,000 KILOGRAM MILKINGS. Livestock raisers of the entire oblast have extensively fortified themselves with the experience of these local dairy farms.

At the same time, close to 100 oblast farms obtained less than 2,500 kilograms of milk per cow last year. There are kolkhozes and sovkhozes where the productivity of the dairy herd does not even attain 2,000 kilograms. Consequently, the principle means for the further development of dairy cattle raising in the oblast is the systematic increase in the productivity of the existing livestock. IN ORDER TO ACHIEVE THE EXPECTED LEVEL OF PRODUCTION AND DELIVERY OF MILK IN THE NEXT 5-YEAR PLAN, LIVESTOCK RAISERS OF THE OBLAST MUST INCREASE THE ANNUAL AMOUNT OF MILK OBTAINED FROM EACH COW TO 3,100 TO 3,150 KILOGRAMS.

The principle direction in this work will be the increase in the milk potential of the dairy herd on the basis of a substantial improvement in the raising of young replacement stock on farms. Specialized heifer kolkhozes will guarantee from 40 to 50 percent of the requirement in replacement stock. Taking into consideration the experience of leading farms such as the kolkhoz "Dnipro" of the Cherkassy Rayon, where last year more than 4,000 kilograms of milk per cow was obtained, participants of the conference acknowledged as expedient the continuation into the next 5-year plan, on a significantly wider scale, the interbreeding of the Simmental cow with livestock of the Holstein-Friesian breed, so-called Holsteinization. For instance, last year in the kolkhoz



"Dnipro" the amount of milk drawn at one milking from the hybrid cows exceeded 4,640 kilograms. The task consists of increasing the quantity of hybrid brood livestock in farms of the oblast to some 50,000 head by the end of the next 5-year plan.

But the effectiveness of Holsteinization depends to a decisive degree upon the feed base. That is why the task is being set to obtain in every year of the next 5-year plan not less than 48 to 50 quintals of feed units per hectare of sown forage crops, and to have for the stipulated head 42 quintals of feed units.

The experience of the oblast's advanced collectives, which the participants visited during the course of the conference, graphically demonstrates that the strengthened development of communal livestock raising is impossible without the broad and creative employment of the achievements of scientific-technical progress.

The participants of the Applied-Scientific Conference accepted the recommendations on the strengthened development of the branch on the basis of the implementation of the achievements of scientific-technical progress.

Responsible persons of the CPSU Central Committee and the UKrCP Central Committee, specialists of the republic ministries and offices, scientists from a number of republic scientific research institutes, and also a group of specialists which was invited from other republic oblasts, participated in the conference's work.

12911/12379  
CSO: 1811/50

## LIVESTOCK

### IMPROVEMENT IN BREEDING OPERATIONS CALLED FOR

Moscow SELSKAYA ZHIZN in Russian 29 Oct 85 p 2

[Article by F. Eysner, corresponding member of VASKHNIL [All-Union Lenin Academy of Agricultural Sciences] and professor, Kharkov under the rubric "Horizons of Scientific-Technical Progress": "Improvement in Breeding Operations Called For"]

[Text] At a conference of the party-management aktiv in Tselinograd the necessity to decisively put into practice intensive methods of production in animal husbandry and to improve and increase the productivity of livestock was again emphasized. Breeding work plays an important role in the fulfillment of this task.

Its efficiency can only be improved by utilizing the achievements of a number of theoretical sciences in the course of the centralization of breeding work. Even the largest farm is capable of doing this. We have established an appropriate breeding operation structure. In the country are operating oblast, republic and union breeding associations, as well as regional and union breeding centers. However, the individual links in this chain are not interconnected and the sphere of their responsibilities is not clearly defined; they are poorly outfitted with the necessary equipment. The structure of cadres requires improvement and even the available specialists in places are diverted to the solution of questions not connected with breeding work. As a result, the entire system has little influence on improving the hereditary qualities of animals.

Thus, the oblast breeding associations are presently occupied primarily with distributing the sperm of bulls, which are concentrated in artificial insemination stations, and also with the fulfillment of plans for evaluating studs, this evaluation bearing for the most part a formal character. In all, there are only one or two specialists in each oblast who are working with other types of animals (besides cattle).

Every livestock specialist knows the importance of the timely replacement of utilized studs in order to avoid interbreeding, which lowers the quality of animals on production farms. This is considered to be the responsibility of oblast breeding associations. But they can only operate with the resources of local breeding farms, and in these, as a result of interbreeding, males and females have long been interrelated. And their substitution leads not to the

elimination but to the diffusion of related livestock. This means that it is necessary to organize an inter-oblast -- and, if necessary, an interrepublic -- planned exchange of breeding materials, just as in the past the Chief Administration of Horses of the Union's Agricultural Ministry distributed breeding stallions to all of the horse stud farms of the country. Currently, no one is doing this.

Republic breeding associations, to all intents and purposes, are deprived of the chance to manage the principal link of breeding operations, the breeding plants, which are called upon to lead genetic progress, providing production farms with ever more valuable studs with each succeeding generation. And what is more, how can they be managed when breeding plants are under the command not only of various administrations but of various ministries? There are plants under union control and under republic control; the Ministry of the Food Industry has its own plants, the Ministry of the Fruit and Vegetable Industry also has its own. The scientific institutions of VASKHNIL and its regional branches have plants attached to them. Quite often oblast organizations also introduce their corrections to the manner of use of the young breeding stock.

Union and republic breeding associations must become the real managers of breeding operations. And to accomplish this, it is necessary to give them actual authority over breeding work in the plants, and over the distribution of young stock produced by them, independent of the departmental subordination of these plants. Of course, it would be even better to concentrate all breeding plants into a single department, thereby intensifying their specialization and liberating them from the unnecessary burdens of production of commodity output, which is more easily and cheaply obtained on farms of the industrial type.

Discussions have been going on for many years concerning the fact that legislation is needed in breeding matters which is no less strict than that in the field of veterinary work. If a breach of veterinary rules can lead to disease and death in cattle, a violation in breeding work, for instance the use of a bad bull, may damage an entire herd for the next 10 to 15 years. Unplanned and unfounded crossbreeding of a species causes just as much harm. It is extremely important to restore the binding obligation for the inventory of breeding stock, and to regulate this inventory in accordance with the demands of centralized data processing by computers. It is necessary to quickly develop and establish a strict procedure for the transmission of raw information from the farm to the computer centers and for the return transmission of processed information along with the corresponding scientific recommendations for use by specialists on breeding associations and farms.

The volume of such information can be significantly diminished. During the organization of kolkhoz and sovkhoz farms in the 1930's, efforts were directed towards assessment of all the livestock animals by a detailed inventory. This is not required now. The experience of a number of farms for dairy cattle breeding shows that fully the entire inventory is sufficiently carried out in the control cow-sheds through which pass cattle calving for the first time -- female offspring of the assessed bulls. For the rest of the breeding herd it

is enough to know whether to leave a given animal in the herd or whether it will harm the growth of the general indices and should be rejected. Similar systems can also be established for the treatment of other types of cattle. For the processing of breeding statistics by computer, it is very important to have standard instructions and recommendations. Currently, computer center programmers are not able to keep up with the changes in instructions on the evaluation of cattle and the appraisal of studs. Union breeding associations, along with scientific institutions, must draw up instructions which will last for at least a 5-year period.

Probably, it would be significantly easier to equip oblast breeding associations and breeding centers with the essential equipment and instruments if the All-Union Breeding Association had plants, workshops and design offices directly subordinate to it which were aimed at the production and improvement of this equipment.

It is time to put the work of the breeding centers on a contractual basis with the breeding associations, which must order the development of the breeding programs, the choice of methods of appraisal, the selection and assortment of animals, the breeding of lines in plant herds, the testing of animals according to immunogenetic indices, the drawing up of catalogues, and so on.

Doubt may arise: Won't the centralization of breeding work reduce the role of specialists in places? We think not. For breeding association workers are only able to carry out breeding measures through the direction and supervision of their activities by the kolkhoz and sovkhos specialists. The organization of the breeding inventory, the reproduction of the herd, and the raising of the young replacement stock, as well as the decisions concerning the use of each specific animal, remain within the authority of the farm specialists. They must directly participate in the development of plans and programs for breeding work. The principal task is for kolkhoz and sovkhos breeders to become real technologists of the breeding business whose working place is right on the farms and at artificial insemination centers, not behind an office desk. But for this to occur they must be rescued from the role of clerk/messenger attached to the chief livestock specialist farm.

Currently, half of the farms have practically no breeders, and many of the present breeders aren't sufficiently qualified. This means that along with improving the programs for the preparation of students in livestock specialist institutes of higher education, the system of courses and schools dealing with the increase in qualifications of livestock specialist-breeders must be broadened. It is also time in oblast breeding associations to begin systematic work with the kolkhoz and sovkhos specialists, with a periodic oral report from each of them, and with broad discussion of positive experience.

The establishment of order in the breeding business, along with the strengthening of the feed base, will improve the level of all livestock specialist work on farms and will help to fulfill the Food Program through the output of products of animal husbandry.

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CSO: 1824/78

LIVESTOCK

UDC 631.15:337: 636.4

PROGRESS OF HOG BREEDING IN VARIOUS REPUBLICS

Moscow SVINOVODSTVO in Russian No 6, Nov-Dec 85 pp 6-8

[Article by S. Braga, deputy chief of the USSR Glavzhivprom: "To Increase the Pace of Pork Production"]

[Text] Currently the hog-raising complexes account for 32 percent of pork production in the public sector. The average daily hog weight gain thereat of hogs in fattening constituted 436 grams, including 477 grams at the state complexes, and expenditure per quintal of weight gain constituted 6.2 and 5.8 quintals of feed units respectively.

Currently the number of hog complexes has risen to 590, including 257 sovkhoz, 183 kolkhoz and 150 interfarm enterprises. In 4 years of the 11th Five-Year Plan the number of hog complexes increased by 63 enterprises. The numbers of the sovkhoz complexes grew from 207 to 257 here. Together with a growth of the stock there was also an increase in the production of pork on these farms.

In a number of union republics, krays and oblasts the basic pork production is currently concentrated on large-scale industrial-type specialized farms. In the Moldavian SSR, Ukrainian SSR, Armenian SSR and Uzbek SSR and in 25 oblasts, krays and autonomous republics of the RSFSR industrial complexes are producing from 50 to 90 percent of the total amount of pork which is obtained.

An impressive contribution to an increase in the pace of the production and sale to the state of pork was made by the complexes of the RSFSR, the UkSSR and the Belorussian SSR.

Thanks to the assimilation of operating and the commissioning of new capacity, the hog complexes of the RSFSR increased the sale of products to the state by 35,000 tons in 1984. At the complexes of the UkSSR pork production increased by 11,700 tons and in Belorussia by 11,700 tons.

A condition of the continued growth of pork production at the complexes is an increase in the hogs' productiveness. We have sound experience with respect to an increase in the productiveness of the stock and an upsurge in the efficiency of the sector.

An average daily weight gain of hogs in fattening of 579 grams with outlays per quintal of weight gain of 6.2 quintals of feed units and 5.7 man-hours of direct labor was obtained at 29 complexes of varying capacity in the Lithuanian SSR in 1984, and for 43 complexes of the BSSR these indicators constituted 499 grams, 5.6 quintals of feed units and 6.8 man-hours.

The complexes with a capacity of 54,000 and 108,000 head per annum have even higher indicators.

Complexes with a capacity of 108,000 hogs produced 12,000 tons of pork on average. The level of pork production per head as of the start of the year had been raised to 165 kilos, the average daily weight gains of hogs in fattening constituted 588 grams, expenditure per quintal of weight gain constituted 5 quintals of feed units and labor expenditure constituted 3.7 man-hours. The prime costs per quintal of pork constituted R100-120. In the year these complexes obtained R230 million profit.

The Sovkhoz-Concern imeni 60-letiya Belorusskoy SSR of Minsk Oblast, the "Luzinskiy" of Omsk Oblast and the "Industrialnyy" of Krasnodar Kray are producing 13,000-14,000 tons of pork in live bulk annually and obtaining 9-9.5 young pigs per farrowing and over 637 grams of average daily weight gain in fattening with a fodder consumption per quintal of weight gain of 4.3-4.4 quintals of feed units and labor expenditure of 2.4-4.8 man-hours at a prime cost of not more than R100.

The complexes last year produced per sow as of the start of the year 1,532 kilos of pork compared with 735 kilos for the kolkhozes, sovkhoses and inter-farm enterprises as a whole.

Some 118 kilos of pork were being raised on average per livestock stall at the start of the year in the complexes, including 134 kilos in Belorussia, 140 in Estonia, 157 in Latvia and 173 kilos in Lithuania. At the same time, however, only 71 and 82.8 kilos of pork were being raised per livestock stall in the Georgian SSR and the Armenian SSR respectively. The complexes of the Ukraine, Uzbekistan, Azerbaijan and Turkmenia, where only 102-106 kilos of pork were raised per livestock stall, are operating below potential.

The rational use of capacity is a principal reserve of an increase in pork production at the complexes. For this reason specialists should work constantly on an improvement in the reproduction of the stock, the correct procurement of stock for each complex, the organization of pureblood breeding, the use of highly productive animals and the undeviating observance of technology.

It has to be noted that complex and animal husbandry concern specialists are studying these questions insufficiently at a number of complexes of Georgia, Armenia, Turkmenia and Tajikistan. In 1984 complexes of the said republics obtained on an annual average per sow less than 13 young pigs, and pork production per sow constituted 800 to 1,260 kilos. As of the start of 1985 the completion of the complexes with stock in the country constituted 100 percent,

whereas in Georgia, Kazakhstan and Armenia the complexes were completed 81, 90 and 98 percent respectively.

The productiveness of the hogs is also still low at many complexes, and 50 percent thereof have average daily weight gains in fattening of no more than 400 grams. In the RSFSR alone some 152 of 278 complexes or 54 percent are obtaining less than 400 grams of average daily weight gain in fattening, and less than 300 grams are being obtained at complexes of Kirov and Voronezh oblasts and the Bashkir and Chechen-Ingush ASSR's. The "Yarishenskiy" Hog-Raising Complex of Orel, the "Novyy" of Voronezh and the imeni Kalinin of Kursk oblasts, the "Abramovskiy" of Maritime Kray and the imeni Shevchenko of Volyna and "Pobeda" of Donetsk oblasts obtained less than 250 grams of daily weight gain in fattening.

There are complexes whose leaders are failing from year to year to adopt the requisite measures to assimilate the practices of technology and production capacity and increase the hogs' productiveness. Such complexes as the "Gubkinskiy" of Belgorod and "Volynskiy" of Karaganda oblasts, the "Malinovskiy" of Krasnoyarsk Kray and a number of others have still not achieved the planned production indicators (production of young pigs per sow, average daily weight gains of the young stock, preservation of the stock, annual product). In 1984 these complexes sold the state 13-28 percent less pork than laid down in the plan or fell short in the supply to the state of over 10,000 tons of pork and in obtaining young pigs per sow of 1.5-3 pigs and from 33 to 200 grams of average daily weight gain of hogs in fattening. Up to 2 feed units and 2 man-hours of direct labor were overexpended per kilo of weight gain. The production cycle has been disrupted for a number of years at these complexes.

Sovkhoz, kolkhoz and interfarm complexes with a capacity of 12,000 and 24,000 hogs per annum show a marked difference in the level of hog productiveness. The productiveness indicators are 25-30 percent lower at them and they consume 40-50 percent more feed than the large-scale complexes.

In 1984 the average daily weight gains of the young hogs constituted 270 grams and in fattening 322 grams at the kolkhoz complexes. Some 90.1 kilos of pork were raised per livestock stall. Some 7.7 feed units and 16.2 man-hours were expended per kilo of weight gain, and prime costs per quintal of pork were R163.

At the interfarm complexes an average daily weight gain of 357 grams and in fattening of 426 grams was obtained, 112 kilos of pork were raised per livestock stall, 7.5 feed units and 7.5 man-hours were expended per kilo of weight gain and the prime costs per quintal of weight gain constituted R138.

A principal condition of the achievement of the planned indicators and the successful operation of the complexes is the preferential creation of a stable fodder base on improved land. A considerable amount of work has already been done on commissioning irrigable and drained land for the complexes. Some 881,000 hectares were commissioned in 4 years of the 5-year plan alone.

Whereas at the first stage of the development of industrial production there were little more than 200,000 hectares of improved land for the creation of fodder facilities, currently the complexes for meat and milk production have almost 3 million hectares of land.

All this is being reflected positively in a strengthening of the fodder facilities. The foremost farms, where efficient use is being made of the improved land, are satisfying the complexes' succulent and coarse fodder requirements in full. Big and stable harvests of fodder crops (from 80 to 120 quintals of feed units per hectare) are being obtained at a number of complexes of the UkSSR, BSSR, LiSSR, LaSSR, ESSR and others.

At the same time it has to be noted that 34 percent of the operating animal husbandry complexes are not fully provided with irrigable and drained land.

In the country as a whole the gap between the animal husbandry complexes' need for drained land and the actual availability thereof constituted as of 1 January 1985 some 315,000 hectares.

It has to be said that together with the positive results in the use of land there are serious shortcomings. The standard of farming is low at a number of complexes, as a result of which the productiveness of the irrigable hectare remains low. Thus at many complexes of Volgograd and Lipetsk oblasts the yield of fodder crops on improved land is not more than 30 quintals of feed units per hectare, in Kurgan Oblast 20 and in Ulyanovsk and Chelyabinsk oblasts 25 quintals of feed units.

To improve the feeding of livestock at the complexes measures have been adopted at plants of the USSR Glavzhivprom to increase the production of starter fodder and regenerated milk. Four plants with a total capacity of 432,000 tons of formula food and 144,000 tons of regenerated milk a year were commissioned in 1983-1984. This will make it possible in the next few years to provide the animal husbandry complexes and state pureblood-breeding concerns and also the public animal husbandry of Moldavia and Belorussia entirely with regenerated milk and to considerably improve the supply to the complexes of starter formula food.

A principal condition of the achievement of the planned volumes of the production of pork and other technical-economic indicators is the timely full-value feeding of the animals.

However, there are instances of individual formula food plants failing to meet the demands of the sectorial standard for the manufacture of formula food for the raising and fattening of hogs at the complexes.

Formula food frequently reaches the complexes with deviations from the requirements of the sectorial standard both in respect of the fineness of the grinding and the degree of balance of the main components. Mineral and vitamin additives are not being introduced in the requisite doses, and the schedules for the supply of assorted formula food are being breached.



Many complexes are removing the defects in the work of formula food industry by their own efforts as far as they can. As a result this is leading to an unwarranted overexpenditure of state resources.

The feeding of the animals with substandard formula food is leading to a reduction in the productiveness and the increased waste of the animals and, as a result, to a product shortfall. A substantial reserve in an increase in the productiveness of the animals and a reduction in the shortage of protein and vitamins in the hogs' diet is the production of grass meal, mixed silage and other fodder directly on the farms. This applies particularly to the sovkhoz, kolkhoz and interfarm complexes with a capacity of 12,000 and 24,000 head, where the use of green fodder and mixed silage considerably reduces the consumption of formula food.

For an increase in the productiveness and pureblood properties of hogs at the country's complexes work is being performed on the creation of highly productive types and crossbreeds. A great deal of work on the introduction of hybridization in hog raising is being performed by scientists and specialists in the RSFSR, the UkSSR, BSSR and MSSR.

Some 32.3 million head of hybrid young stock were obtained in the country in 1984. The introduction of hybridization in hog raising makes it possible to raise the animals' productiveness 8-10 percent and reduce fodder consumption per unit product 3-5 percent, to which the experience of the work of the country's foremost enterprises--the "Luzinskiy" (Omsk Oblast), "Industrialnyy" (Krasnodar Kray), imeni 60-letiya BSSR (Minsk Oblast) and others--testifies. However, hybridization in hog raising is only being introduced slowly.

The construction of pureblood farmsteads and sectors at the hog-raising complexes is being undertaken at an inadequate pace.

The existing hog-raising breeding centers are not catering for work to improve hog breeds with reference to hybridization systems per zones of the country. Hog-raising breeding-hybrid centers are only being constructed slowly, particularly in the RSFSR. These questions are being tackled inadequately in the KaSSR and UzSSR.

Speaking of the potential for an increase in the productiveness of hog raising, we cannot remain silent about the engineering equipment, on which the economic efficiency of production depends. There are still substantial complaints about the quality, longevity and reliability of the equipment supplied by Ministry of Machine Building for Animal Husbandry and Fodder Production plants. This applies particularly to heat and ventilation installations and feed-distribution lines. Individual equipment models do not correspond to the demands of technology and have low operating indicators. The complexes are experiencing difficulties in securing for them materials and spares for maintenance.

There is a poor state of affairs concerning provision of the complexes with veterinary products, medicines and disinfection agents. Disinfection equipment which would correspond to the requirements of veterinary servicing technology is absolutely inadequate at the complexes. The "OM"-type installations

which are being manufactured have a number of appreciable shortcomings in respect of the basic indicator--the washing of the premises. The UDP small disinfection installations, on the other hand, which are in great demand, are being manufactured only in a small quantity. The zoo-veterinary service is almost completely lacking in auto-injectors, contact and remote-indicating thermometers and diagnostic instruments for monitoring swine gestation and a live evaluation of the young stock's meat properties. There is insufficient laboratory equipment, instruments and agents for diluting the sperm of boars which are essential for the precise and continuous operation of hog artificial insemination stations and centers.

The timely solution of questions of the material-technical supply of the complexes, an improvement in the feeding of the animals and observance of the accepted technology will make it possible to assimilate available production capacity more fully and raise the level of efficiency of pork production by intensive methods.

Taking advantage of the state's practical experience, leaders and specialists of the agrarian-industrial associations and complexes are channeling the labor collectives' efforts toward the use of available potential and possibilities for a further increase in the pace of production, a rise in the economic efficiency of industrial hog raising and a fitting greeting of the 27th CPSU Congress.

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## LIVESTOCK

### INDUSTRIAL CROSSBREEDING IN HOG RAISING DISCUSSED

Moscow SELSKAYA ZHIZN in Russian 28 Sep 85 p 1

[Article by Z. Gil'man, head of the Pork Production Technology Department of the Belorussian Scientific Research Institute of Animal Husbandry, doctor of agricultural sciences and professor; V. Kislyakov, director of the Sovkhoz-Combine imeni 60-letiya BSSR and candidate of agricultural sciences, S. Vonsovich, director of the Luchesa Sovkhoz-Combine; and M. Khromushin, director of the Voskhod Sovkhoz-Combine; "Rejuvenating the Brood Herd: The Immediate Task Is the Production of Meat"]

[Text] It is hardly necessary to convince anyone that pork production can be significantly increased if the phenomenon of heterosis is widely utilized--heterosis being the increased vitality of newborn stock brought about as the result of industrial crossbreeding and hybridization of animals of various breeds and types. However, the organization of this work requires improvement. As is known, this work is based on the "pyramid principle" (borrowed from poultry breeders). At the base of this pyramid are the commodity farms (tovarnoye khozyaystvo) and at the summit, the breeding plants (plemzavod). The breeding plants improve upon existing animals and develop new breeds, types, and strains of animals. They also deliver the pedigreed animals to the pedigree farms (plemkhoz) concerned with the animals' pure reproduction and supply young pigs to breed reproducers (plemreproduktory). These breeding reproducers, in turn, reproduce the purebred or hybrid, pedigreed young pigs and turn them over to the commodity farms. The latter, utilizing interbreed, industrial crossbreeding or breed-line hybridization, also obtain young stock for fattening-up. The self replacement of the herd, that is the rejuvenation of the herd with young stock raised at the very same complex, is not permitted during this process.

This simple, and at first glance, effective system has proven its worth by the many years' experience of poultry breeding farms. However, in the very first attempts in the practical assimilation of these systems, it became clear that far from everything that has justified itself in poultry breeding is also good for hog breeding. The situation during the graduated distribution of breeding (selektionnyy) materials from farm to farm in hog breeding is quite different from that in poultry breeding: in poultry breeding this entails the egg, in hog breeding it is the animals themselves, whose intensity of selection (otbor) decreases in relation to the number of animals, which is lower with each successively higher level. The danger of the spread of disease also increases.

It is not surprising that the systems originally developed for hog breeding are undergoing fundamental changes in practice. The Sovkhoz-Combine imeni 60-letiya BSSR complex, along with many other pioneers of industrial hog breeding, has begun to create pedigree stock farms and select for breeding a portion of the best young pigs grown right there in the fattening shops. Contrary to our misgivings, this young animal was not at all inferior in quality to the one delivered. In the course of the experiment, we checked 3,000 animals--1000 from each group. Under equal conditions, from the sows coming from the breeding plants the average number of piglets obtained in a year was 22.4 each; for the sows coming from the pedigree stock farm the average was 20.2 each per year; for those sows raised right in the complex, the average was 20.4 piglets each per year. For the entire period of a sow's utilization on the farm, from each was obtained 47, 44, and 37 head of young stock respectively. The average yearly income from the sale of pork, calculated per sow, equaled, for these groups, 2,180, 2,071, and 2,117 rubles, and the profitability equaled 95, 101 and 105 percent.

As became clear in the course of things, despite all precautionary measures, infectious diseases appeared with the young pigs delivered to the complex. It must be said that the size of the pedigree stock farms adopted in the standard plans (570 to 600 sows) proved to be quite insufficient for intensive selection for breeding of the best animals. Practically all the young pigs from the pedigree stock farm went to reproduction, with the exception of obvious rejects, while at the same time from those raised right on the complex, only the one very best young pig from several dozen was sent to the insemination shop.

Taking all this into account, on the whole we gave up the constant delivery of replacement young pigs from breeding plants and began to raise them on pedigree stock farms. In order to strengthen the intensity of the selection, we are increasing the size of the pedigree stock farms from one and a half to twice their former size so as to annually supply to the complex not less than 4,500 young hogs in place of the 2,700 as per the original plan. The results of the work of the enterprise--one of the best in the country--speaks persuasively about the impact this sort of system of breeding work has. Breeding farms here obtain 11 piglets per farrow from each sow, and the young pigs' milk productivity has reached 56 kilograms. At the complex itself, the average annual yield per sow is more than 20 piglets, and the average daily weight gain of the young stock being fattened up is 670 to 690 grams each with the expenditure of only 4.2 to 4.3 feed units per kilogram of additional weight. The average annual profit for the enterprise exceeds 15 million rubles, and a million of these rubles are from the introduction of progressive methods of animal breeding.

As we see it, the technology of breeding work proposed by us significantly differs from that which is generally accepted and which underlies the standard plans of the large hog breeding complexes.

The Voskhod Sovkhoz of Mogilev Oblast and Luchesa Sovkhoz of Vitebsk Oblast have used a system of breeding work that permits the replacement of the brood herd with young pigs raised right on the complex. Here there are complexes operating that are designed to raise and fatten 24,000 hogs a year each. The replacement young pigs were initially delivered from interfarm reproducers.

But they supplied the young animal irregularly as well as one of low quality. Consequently, up to a third of the young pigs had to be acquired from the fattened-up livestock or had to be delivered from chance sources.

The construction of their own breeding farms has yet not taken place on average size and small size complexes. And this is scarcely justified. Several hundred of these establishments should be built on a country-wide scale, expending at least 2 million rubles on each one. A search has begun for other methods of breeding work. Such a sort of technology has been used so that the productivity of young pigs during their growth at the complex is not lowered and so that the impact of interbreed crossbreeding is not diminished. Thus, in the Sovkhoz-Combine imeni 60-letiya BSSR, the young pigs are raised with a run allotted to them, and, in addition to this, at the warm time of the year they go out into summer camps. Green mass and grass meal are included in their food allowances. In place of generally-accepted, simple crossbreeding, rotational (alternating) crossbreeding is employed. In this case, purebred boars delivered from pedigree stock farms are selected in turn for the hybrid sows of one's own herd. This method of industrial crossbreeding has been put into use very well in the flow-line system of livestock reproduction being used in the complexes. The intensity of selection of young pigs, in comparison with the previous level, has increased by 10 times, which has significantly improved the quality of the brood herd.

After the assimilation of this technology, the annual production of piglets on the Luchesa Sovkhoz increased by 7,000, and on the Voskhod Complex by 3,000. Here they obtain annually 20,000 to 30,000 head of young stock each as opposed to 24,500 per the plan. Both farms have far surpassed comparable complexes on the basis of other decisive indices as well. The average daily weight gain of the young stock being fattened has reached 520 to 530 grams, and not more than 540 to 580 feed units are being expended for the production of a quintal of pork. Annual expenditure for the purchase of replacement young pigs on each farm has decreased by 150,000 rubles; profit has increased to 2.2-2.5 million rubles and is almost double the republic average indicator for comparable complexes.

In the course of a widespread industrial check-up (all in all the productivity of more than 100,000 animals was considered) it has been established that in a real production situation on complexes with a production volume of up to 24,000 hogs per year, replacement young pigs can be selected from the best sows from one's own herd without forced delivery from other farms. The intensity of selection is strengthened by 5 to 7 times or more. At the same time, the cost of the pedigreed young stock is decreased by 2 to 2.5 times.

It is necessary to consider all this in future breeding work. And there must be no delay in doing this since in the endeavors for a transition to 100 percent delivery from pedigree stock farms to commodity farms not only of boars but also of young pigs, measures are being undertaken to increase the capacity of the breeding network at least 10 times, which has already cost millions in funds and will require even larger capital investments which, as the experience of the leading farms has shown, will not be recouped in proper measure. To invest

even further large capital in an insufficiently proven--and in our opinion, unreliable--matter is at the very least premature. It is much more prudent to concentrate capital investments on the reconstruction and improvement of breeding plants, on the construction of stations for raising and evaluating boars, and on an increase in the capacity of breeding farms attached to the largest complexes. And it is time to stop the construction of breeding farms and breeding sections attached to complexes with a capacity of up to 24,000 hogs a year. It is much less expensive to add to, or to allot from, the number of existing buildings specialized pigstys for the raising of replacement young pigs of one's own reproduction. This will permit a decrease of capital investment on the building of facilities for the reproduction of sows on farms of the industrial type by at least 10 times with a simultaneous multiple strengthening of the intensity of selection of pedigreed young stock. This is being done in the country. In Estonia, young pigs reproduced from the herd are used for rejuvenating the brood herd on all farms without exception, and nowhere have they hindered the achievement of good results: the republic holds first place in the country in the branch's productivity and economic effectiveness.

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REGIONAL DEVELOPMENT

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APPLICATION OF SCIENCE, TECHNOLOGY IN ESTONIAN APK

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/Article by Kh. Veldi, 1st deputy chairman of the Council of Ministers and chairman of Agroprom for the Estonian SSR: "Scientific-Technical Progress in the Agroindustrial Complex"/

/Text/ During the April (1985) Plenum of the CPSU Central Committee, special emphasis was placed upon the fact that in connection with a further change or transformation in our life style or in achieving a new qualitative status for society, the party expects the primary role to be played by the scientific-technical renovation of production and by the achievement of a high international level for labor productivity.

An acceleration in scientific-technical progress in the APK /agroindustrial complex/ is today considered to be the chief trend in the agrarian economic policies of the CPSU and the principal lever for the intensification of agriculture and for raising its efficiency.

In carrying out the decisions of the Communist Party and Soviet State, Agroprom for the Estonian SSR, under the direction of the republic's party organization, is performing active work aimed at accelerating the conversion of the branches of the agroindustrial complex over to the path of intensive development, introducing scientific and engineering achievements and leading experience into production operations, improving the administration of the economic mechanism, the social reconstruction of the rural areas and, on this basis, achieving increases in labor productivity and in the production of food products.

The republic's APK includes a complete system for organizing and administering scientific-technical progress, a system characterized by planned operations, the movement of innovations into production operations in a staged manner, increased independence, the development of initiative and an increase in responsibility for all elements associated with the introduction of new equipment and technology.

The APK structure includes 15 scientific, planning-design, technological and other organizations, with an overall personnel strength of approximately 4,000. The coordination of scientific studies and branch plans for the introduction into production of scientific and engineering achievements and leading experience is carried out by the Scientific-Technical Council of Agroprom for

the Estonian SSR, which orients the scientific institutes towards ensuring the completeness of their works and searching for resource-conserving methods for developing agroindustrial production.

The principal trends for scientific and engineering development are set forth in the long-range program for scientific-technical progress in the Estonian SSR and in the special purpose all-round programs and work programs for solving the more important scientific-technical programs, approved by GKNT /USSR State Committee for Science and Engineering/, USSR Gosplan and the USSR Academy of Sciences. One flexible form for organizing scientific studies and introducing innovations into production -- republic special-purpose programs -- has undergone further development.

A portion of the all-round special-purpose and scientific-technical programs encompasses specific agricultural problems: industrial development of cattle husbandry, the production of grain, potatoes, grass feeds and feed protein, physical-chemical biology, biotechnology and others. Within the programs, the work of the branch scientific-research institutes, the Estonian Agricultural Academy, the scientific institutes of the Estonian Academy of Sciences, VUZ's, leading kolkhozes, sovkhoses, enterprises and organizations has been merged into a single entity.

The scientific-research institutes for farming and land reclamation, livestock husbandry and veterinary science of Agroprom for the Estonian SSR (EstNIIZM and EstNIIZhV) and also some institutes of the Academy of Sciences for the Estonian SSR (institutes of experimental biology, economics, chemistry, chemical and biological physics), the Estonian Agricultural Academy and institutes and SKB's /special design offices/ of branch ministries and departments serve primarily as the scientific-technical base for determining progress in agriculture. The local soviets of people's deputies and the republic's scientific community are also participating actively in this work.

The coordination of scientific-research work in farming and land reclamation and also in livestock husbandry is carried out by VASKhNIL /All-Union Academy of Agricultural Sciences imeni V.I. Lenin/ (through leading institutes and the western branch). At the republic level, these functions have been assigned to the Scientific-Technical Council of Agroprom for the Estonian SSR.

Within the system for guiding scientific-technical progress, special attention has been given to organizing the mass introduction of scientific-technical achievements into operational practice. Here an increasing role is being played by support-demonstration and experimental farms of scientific-research institutes.

The special purpose tasks for developing agriculture and its associated APK branches, based upon modern scientific-technical achievements, are defined in the republic and rayon food programs and reflected in the branch and territorial plans for economic and social development. An increase has taken place in the output being realized from the potential of scientific institutes with regard to production operations. For example, the economic effect realized from each ruble expended at the Scientific Research Institute of Farming and Land Reclamation increased from 5 rubles in 1981 to 9.2 rubles in



1984 and at the Scientific Research Institute of Livestock Husbandry and Veterinary Science -- from 6.9 to 8.3 rubles respectively.

Great importance is being attached to the creation of appropriate logistical and economic conditions for the planned reorganization of production on a scientific basis. Capital investments and material and labor resources are being concentrated in the chief areas with respect to scientific-technical progress. During the current five-year plan, the productive fixed capital of an agricultural nature increased by 21 percent and the capital-labor and power-worker ratios at kolkhozes and sovkhoses -- by 25 and 18 percent respectively. Sixty percent of all agricultural lands and 86 percent of the lands drained by means of closed drainage were reclaimed.

The effect of economic levers with regard to accelerating scientific-technical progress was further intensified. Agroprom is persistently carrying out work aimed at smoothing out the management conditions for kolkhozes and sovkhoses, an important element of which is the extensive use of normative methods for evaluating the utilization of land, labor resources, productive capital and others.

At kolkhozes and sovkhoses, production concentration is being raised, production specialization is being intensified and intraorganizational accounting procedures are being introduced into operations.

A great amount of work is being carried out in connection with improving the business-like skills of personnel, ensuring better placements for them and their retention in the rural areas and improving their operational style and methods. The periodic certification of leading and engineering-technical workers has been organized. Two thirds of the kolkhoz chairmen and more than one half of the brigade leaders and farm heads have been working at the same farm for more than 5 years. Inventive and industrial efficiency work and the activities of scientific-technical societies have become a constantly active factor with regard to raising the technical level of production.

Purposeful work by the party, soviet and economic organs in mobilizing the efforts of labor collectives towards carrying out the Food Program and improving the technical equipping of the branches has made it possible to achieve a high level for labor productivity in agriculture. During the 1981-1983 period the average annual gross output per worker engaged in the public sector reached 9,075 rubles and in 1984 -- 12,000 rubles. Direct labor expenditures for the production of the principal agricultural products in 1984, in the case of grain production at kolkhozes, amounted to 0.9 man-hours per quintal and at sovkhoses -- 1; potatoes -- 1.3 and 1.6 respectively; vegetables grown outdoors -- 5 and 3.1; per quintal of increase in live cattle weight during fattening and young stock -- 15.5 and 16.1; weight increase in hogs during fattening and young stock -- 9.3 and 9.6; milk -- 3.2 and 3.3 man-hours per quintal respectively.

In 1984 the average milk yield per cow on the farms was 3,855 kg and the average daily increase in live weight in hogs during fattening was 468 grams and for cattle during fattening -- 607 grams. For the production of 1 quintal of milk, 107.8 feed units were expended and for 1 quintal of weight increase in

cattle -- 890 and in hogs -- 560 feed units. The production cost per quintal of weight increase in cattle during fattening and in young stock amounted to 173.47 rubles at kolkhozes and at sovkhozes -- 184.34 rubles, the increase in weight in hogs during fattening and in young stock -- 144.8 and 149.01 rubles respectively, milk -- 26.58 and 26.33 rubles and 1,000 eggs -- 65.12 and 53.92 rubles.

Over the past 2 years, all of the tasks concerned with purchases of the principal agricultural products were over-fulfilled. In terms of this indicator, the republic achieved for the most part the 1984 goal of the Food Program. The purchase plans for 1985, in terms of all indicators, conform to the control figures of the program for this year, with the exception of meat purchases, the missing volume of which will be ensured by means of farm counter plans. The total profitability in 1984 amounted to 35 percent at sovkhozes and 40 percent at kolkhozes. The republic does not have one unprofitable farm. The attitude of the agricultural workers towards their work has changed. This has brought about a reduction in the migration of the rural population to cities and this factor is of special importance to the republic in view of the fact that only approximately 13 percent of the able-bodied population works in rural areas.

As emphasized during a meeting of the party-economic aktiv on 7 September 1985 in Tselinograd, one of the most important requirements for carrying out our work is the ability to combine the solutions for future tasks with those for current ones. The development of a long-range outlook and the establishment of goals for socio-economic development are of tremendous importance.

Under conditions wherein the goals of the republic's Food Program have already been achieved, special importance is attached to correctly determining those economic and quality parameters which must ensure stable rates for expanded reproduction of agricultural output in the future. Scientific-technical progress must be directed towards achieving solutions for these problems.

An acceleration of scientific-technical progress within the republic's APK is closely associated with the soil-climatic conditions of agricultural production. Whereas these conditions are for the most part similar to those characterizing the northwestern zone of the USSR (high moisture content, short growing season, great heterogeneity of the soil cover, light contour conditions and so forth), nevertheless considerable differences exist in the case of individual indicators.

A substantial peculiarity of the land is the stoniness of its soil. It can be said that the soil of Estonia is the country's stoniest soil. Such soil is found on 82 percent of the intensively cultivated land. The volume of rocks in the 0-30 cm layer, in the northern and western portions of the republic, fluctuates on the order of from 300 to 400 cubic meters per hectare and in the central and southern portions -- from 100-300 cubic meters per hectare. As a rule, the rock content in the sub-arable layer is higher by a factor of 2-3. The removal of rocks at kolkhozes and sovkhozes accounts for 25-30 percent of the overall volume of spring work.

The republic's land fund is characterized by a large proportion of alvarniy, rikhkovi, heavy clay, peat and eroded soils, which constitute almost 47

percent of the intensively used land considered to be unsuitable for the intensive cultivation of grain, potatoes and other field crops. Owing to a low humus content (1.5-2 percent), a majority of the republic's soils require systematic applications of organic fertilizers (an average of 12-13 tons per hectare annually).

In view of the mentioned and other peculiarities of the land fund and climate, a scientifically sound system for farming and livestock husbandry has been introduced throughout the republic, one which makes it possible to obtain maximum quantities of milk, meat, grain, potatoes and other agricultural products from each hectare of land, with minimal expenditures of labor and material resources.

Here there is a broad sphere of activity for mechanization and for improving the agricultural practices. For example, in order to obtain more than 30 quintals of grain, approximately 200 quintals of potatoes and 50 quintals of perennial grasses per hectare in field crop husbandry, constant purposeful and tedious work is required, commencing with science and ending out on the fields. Taking into account the specific and complicated natural conditions found in the region, importance is always attached to achieving more efficient means and methods for obtaining high yields. During a meeting in Tselinograd, this approach was considered to be a key one with regard to all economic work being carried out in the APK.

Among the scientific-technical measures being carried out in grain production, the chief ones should be singled out. Breeding of new and highly productive varieties. Five grain crop varieties characterized by high potential yields and good quality grain have been developed and introduced into operations within the republic over the past 5 years. At the present time, 2 more barley varieties, 1 variety of oats and 1 wheat variety are in the process of being introduced. Scientific seed production on the farms is based upon the use of elite and super elite seed. This ensures an average increase in yield of 10-15 percent and considerably more when reliable agricultural practices are employed. Thus the regionalized and intensive Krit and Yuliya barley varieties supplied the Viru Kolkhoz in Rakvereskiy Rayon with 55 quintals per hectare from large tracts. A barley yield in excess of 80 quintals per hectare was obtained from individual tracts at the 9 May Kolkhoz in Paydeskiy Rayon. During 4 years of this five-year plan alone, EstNIIZM sold 12,200 tons of seed for highly productive varieties to the farms.

All-round improvement in agrotechnology. Towards this end, work is going forward on the development and introduction into production of an intensive agrotechnology for the cultivation of grain crops, the chief elements of which have been differentiated in conformity with the principal soil characteristics of the republic.

The results realized from the introduction of the intensive technology are very convincing. The average grain crop yield at the Vyayke-Maarya Kolkhoz in 1984 was 50.7 quintals per hectare, at the Vambola Kolkhoz -- 46, at the Tartu Experimental-Demonstration Sovkhoz -- 44.4, at the Luunya Sovkhoz -- 43.6 and at the Paala Kolkhoz -- 41.4 quintals per hectare. The plans call for the new technology, which makes it possible to achieve an average grain yield of 40-45

quintals per hectare, to be introduced into operations on an area of 40,000 hectares during the 1986-1988 period.

An expansion will take place in the introduction into production of grain seed processing work involving the use of physiologically active chemical substances (growth regulators) and fungicides, which ensure improved resistance against lodging in grain crops and an increase in yields of 2-5 percent.

In the interest of raising the effectiveness and productivity of post-harvest processing of grain, work is being carried out aimed at modernizing the drying and cleaning complexes, with use being made of a recirculation technology and two-stage drying and heating of the grain. Some of the shaft dryers are being converted over to automatic control.

Similar measures are being undertaken in potato and vegetable production operations. Two new potato varieties have been developed over the past 5 years. Of the overall area of potato sowings, 97 percent were sown using seed of varieties which were bred in the republic. In 1984, the Sulev potato variety, developed at the Yygevaska Plant Breeding Station, furnished an average of 357 quintals of tubers per hectare on fields of the Pydra Kolkhoz. A system has been introduced for protecting seed potatoes against virus diseases. This system, which is based upon the use of heat-therapy and apical meristem, makes it possible to use seed material possessing a high potential cropping power for the production of marketable potatoes.

The future program for scientific works in potato production calls for the development and introduction into production on an extensive scale of one early-ripening and one medium-late variety of table potatoes having a potential cropping power of 400-500 quintals per hectare and the development and introduction into use on an area of 5,000-6,000 hectares of intensive technologies for the cultivation of potatoes, which will ensure high and stable yields on the order of 200-300 quintals per hectare, with an expenditure of not more than 1 man-hour for the production of 1 quintal of potatoes. The average potato yield on farms where the intensive technology was introduced was 358 quintals per hectare at the Vambola Kolkhoz, 332 quintals per hectare at the Sangaste Plant Breeding Station, 329 quintals per hectare at the Vinni Sovkhoz-Technical School and 306 quintals per hectare at the Viru Kolkhoz.

Work is being carried out in connection with improving the system of post-harvest processing, procurements and storage of potatoes, that will make it possible to lower losses by 10-30 percent and raise substantially the quality of table potatoes. Chemical and biological methods for combating the pests and diseases of agricultural crops are being introduced into production operations. The industrial production of pheromones, yuvenoids and other preparations has been mastered.

An important branch of field crop husbandry is that of feed production. Today up to 90 percent of the perennial grass sowing areas are being sown using only high quality seed. Plant breeding is being carried out aimed at raising the yields and feed value of the grasses. One variety of clover and three varieties of cereal grasses, all of which surpass by 5-10 percent the yields of varieties already in use, will be introduced into production operations.

The all-round special purpose program entitled "Production of Protein" calls for a sharp increase in the production of protein-rich grasses (leguminous grasses, rape, white sweetclover).

In order to obtain maximum quantities of livestock products, those feeds which furnish higher yields and contain more protein are being produced on an intensive basis. Special reliance is being placed upon grass feeds.

The republic's perennial grass yields increased from 2,550 feed units per hectare in 1980 to 2,920 feed units in 1984, that is, the productivity of the feed lands is now only slightly inferior to that for the grain fields. In this regard, the task was assigned during the meeting in Tselinograd to carry out the production of feed on farms in just as intensive a manner as grain production under Agroprom conditions in Estonia.

The plans call for the development and introduction into production of an intensive conveyer system for the production of these feeds, which will make it possible to ensure the feeding during the indoor maintenance period of not less than 10 kg of dry grass substance daily, with a 13 percent protein content per standard unit of livestock.

EstNIIZM has developed and introduced into production on an extensive scale a method for preserving grass feed, with use being made of internally produced preservatives that ensure preservation of 90-98 percent of the nutrients. The method of processing feed straw using anhydrous ammonia and also the preserving of damp forage grain with the aid of ammonium carbonate and ammonium bicarbonate has proven to be effective. Both methods serve to raise the quality and nutritional value of the feed.

Improvements in the fertility of soils and the efficient use of mineral fertilizers is closely associated with the organization of the agrochemical service almost 30 years ago. The determination on a mass scale of the soil requirements for macro and microfertilizers has been carried out throughout the republic. As a result, each farm has cartograms on the fertilizer requirements of soils. EstNIIZM now composes for each farm intra-farm plans for the use of fertilizers using EVM's /electronic computers/, with the economic effect realized by the kolkhozes and sovkhoses reaching an annual average of 27 million rubles.

The production of soil cultivation equipment suitable for use on stony fields has been organized at workshops of Selkhoztekhnika and at kolkhozes and sovkhoses. Here, roughly 2,580 tractor plows with stone-protection units have been produced and also hundreds of machines for removing stones from the surface of fields.

High yields per cow, minimal labor expenditures and maximum increases in the live weight of cattle per unit of feed -- these then are the main trends to be pursued in the development of livestock husbandry in the republic's Agroprom.

Scientific-technical progress in livestock husbandry has led to the production level achieved, mainly through the introduction of leading experience and scientific achievements into breeding work and also through improvements in the

feeding of livestock and in mastering the use of the intensive technology on large farms.

A "scientifically sound system for breeding work in connection with the development of cattle" has been developed and is being introduced into breeding operations. EstNIIZhV has experimental farms for this purpose, where the program is approved and subsequently introduced into operations at all of the remaining farms. Commencing in 1975, the artificial insemination of cows has been carried out using only deep frozen sperm. The dissemination of this method is making it possible to obtain highly productive animals from well matched parental pairs. A method for transplanting cow embryos, which makes it possible to obtain up to 25 calves annually from one highly productive cow, is in the stage of being introduced into operations. At the present time, seven calves have already been obtained using this method.

In the interest of obtaining more objective data on the breeding qualities of bulls, an evaluation of them in terms of offspring is now being carried out using a new system: the bulls are evaluated not only at experimental farms but also at all of the republic's breeding farms.

Eighty percent of the cows are being inseminated by improvement-bulls, with the remaining animals being given the sperm of bulls which are being tested. The processing of the initial data concerned with this work and control over productivity are being carried out with the aid of an EVM [electronic computer].

EstNIIZhV is conducting a centralized and automated analysis of the fat and protein content in milk for all cows in the public sector. At the same time, the number of somatic cells in the milk is also being determined; this will make it possible to uncover those cows afflicted with mastitis at an early stage.

Purposeful breeding work has promoted a considerable increase in the potential productivity of the livestock. In 1983, 10 cows which were not force-fed furnished more than 10,000 kg of milk with a high fat content. The Vyandra Experimental Sovkhoz obtained 15,563 kg of milk from its cows.

In recent years, the milk yields for cows of the Estonian black-variegated strain have increased as a result of the infusion of blood from Holstein-Friesian cattle. In 1984 the milk yield on breeding farms was 4,453 kg per cow.

Similar to cattle husbandry, a single system for breeding work has been introduced also into swine husbandry operations. For the purpose of raising the breeding effect and in addition to controlled fattening, a system is being introduced for the controlled raising of boars. The artificial insemination of hogs is expanding. In addition to the well known Estonian bacon strain, approval has also been given for a new type of hog of the large white strain.

Such dangerous and infectious animal diseases as brucellosis and tuberculosis have been eliminated as a result of measures developed for the prevention, diagnosis and control over agricultural animal diseases.

Many biostimuli are being employed for raising the resistance of animals against diseases: acidophilin-bacterial substance, gamma-globulin, kheamin, bobiket and others.

Such effective substances as Estosteril and Mastisteril are being produced for the disinfection of farms and the disinfection of nipples following the milking of cows.

The existing level of development for the production of livestock husbandry products and the savings in labor expenditures were achieved as a result of the introduction of the industrial technology and leading methods for the maintenance of animals, which are based upon a rational combination of technological and production potential and the mechanization of technological lines based upon the machines and equipment produced, with local conditions being taken into account.

For example, there are now 282 dairy complexes in which approximately one half of the dairy herd is being maintained. As a result, a republic average of 3.3 man-hours is being expended for the production of 1 quintal of milk and on leading farms -- less than 2 man-hours.

Complexes are being created in swine husbandry for the production of young pigs.

Poultry production operations are concentrated mainly at specialized poultry factories that have converted over to an industrial basis.

The achievements of scientific-technical progress in field crop husbandry and livestock husbandry are associated to a large extent with constant research being carried out aimed at improving the administration of the agroindustrial complex.

The republic has concerned itself with improving administration at the rayon level since 1975, at which time one of the first rayon agroindustrial associations in the country -- the Vilyandiskoye RAPO -- was created. Since 1 October 1981, agroindustrial associations have been in operation in all 15 of the republic's rayons. The experience of these associations has required radical changes in the administration of the APK [agroindustrial complex] and at the republic level. An agroindustrial association of the Estonian SSR (Agroprom ESSR) has now been created in place of the abolished Minselkhos [Ministry of Agriculture] for the ESSR and Goskommeliovodkhoz for the ESSR. At the same time, Estptitseprom and Estselkhozkhimiya were abolished. The enterprises of rayselkhoztekhnika, which are subordinate to the rayon agroindustrial associations (RAPO's), continued to be the only organizations for servicing the kolkhozes and sovkhazes.

The creation of a single organ of administration for the republic's APK made it possible to eliminate a portion of the duplicate elements in the administrative organizations of the abolished ministries and departments and to create functional subunits within the ESSR Agroprom structure which would be concerned with matters associated with its own profile. The overall size of the administrative apparatus of the ministries and departments was reduced by

12 percent. Instead of 60 structural subunits, only 34 remained. Over a period of 2 years, the operational experience of ESSR Agroprom revealed great advantages offered by this system of control and yet the experiment continues with some questions requiring further improvement. With the creation of ESSR Agroprom, an improvement was noted in the coordination of scientific-technical progress within other branches included in the agroindustrial complex.

The relationships between the processing enterprises on the one hand and the kolkhozes on the other became stronger, more complete utilization is being made of agricultural raw materials and the use of low-waste and waste-free technologies and progressive methods for storing products is increasing. In 1984 the production of products of the food, meat and dairy and fishing industry increased by 10 percent compared to 1980.

An example of effective inventions from allied branches is the series of scientific works carried out by the KTB's /design and technological offices/ of ESSR Minmyasomolprom /Ministry of the Meat and Dairy Industry/, which created a basically new technology for extracting food components from meat and bone waste products. It makes it possible to obtain 130 kg of dry protein, 270 kg of nutritional fat and 270 kg of nutritional mineral product from 1 ton of meat and bone waste product. This makes it possible to organize the production of highly valuable amino acids. Distinct from foreign technologies, the technological process developed by the KTB is carried out without the use of chemical preparations and on serially produced equipment.

New technological units have been introduced into the ESSR Minzag /Ministry of Procurements/ system which make it possible to add grain components to the mixed feeds automatically. In addition, the capabilities for granulating the feed have been increased and a technology has been introduced for enriching the mixed feeds with liquid components.

Within the ESSR Minplodoovoshchkhov /Ministry of the Fruit and Vegetable Industry/, just as throughout the ESSR Agroprom system as a whole, one of the most important trends in scientific-technical progress is the introduction of EVM's /electronic computers/ and ASU's /automatic control systems/ (controlling a regime for hothouses and vegetable storehouses, logistical supply, the distribution of mineral fertilizers and others).

The ESSR Academy of Sciences is carrying out a great program of scientific studies in behalf of the republic's agriculture, with much of the work being conducted jointly with VASKhNIL /All-Union Academy of Agricultural Sciences imeni V.I. Lenin/. This program includes: the theoretical principles and methods for ensuring the efficient use of land and water resources, questions concerned with the use of chemical processes in agriculture, a study of the genetic principles involved in the breeding of agricultural plants, the microbiological problems of agricultural production, the development in the sphere of chemical biology and biotechnology of production mechanization, electrification and automation and the economics of the agroindustrial complex. Many promising scientific-practical works are being carried out in behalf of agriculture by educational institutes of the ESSR Minvuž /Ministry of Higher and Secondary Specialized Education/ (biological resources for the protection of plants) and by republic branch institutes (NII /Scientific Research Institute/ for Construction, NII for Slate, NII for ESSR Gosplan and others).



At the fish industry Kolkhoz imeni S.M. Kirov of Estrybakolkhozsoyuz, a technology has been introduced for the all-round utilization of waste products obtained from the processing of fish. A shop has been built for the production of whole milk substitute from these waste products. In 1984 the kolkhoz produced 3,000 tons of whole milk substitute and realized a savings of 400,000 rubles.

The experience accumulated by the Kuusalu Kolkhoz in Kharyuskiy Rayon in strengthening the feed base for livestock husbandry is deserving of a great amount of attention. This farm, jointly with scientists from the Belorussian SSR, has developed and introduced a technology for the microbiological processing and enrichment of whey with yeasts; a shop for the production of feed additive based upon the use of whey is continually in operation.

Inventors and efficiency experts are making a substantial contribution towards accelerating scientific-technical progress within the APK /agroindustrial complex/. During 4 years of the current five-year plan, more than 1,300 inventions and 70,000 efficiency recommendations were introduced into operations. The economic effect amounted to more than 150 million rubles.

In 1984 the ESSR Agroprom plan for the introduction of new equipment included 147 measures the implementation of which produced a savings of 4.3 million rubles. The greatest effect was realized from the introduction into production of plows with stone-protective units, rake-agitators, toothless drag harrows and also from the restoration of worn out parts.

The introduction of new equipment is promoting a considerable reduction in manual labor. For example, the removal of rocks by one rock-collecting unit produces a savings in labor on the order of 13-17 workers. Their output increased considerably as a result of the production of implements for powerful tractors. Thus, for example, the annual output of a T-150K tractor increased from 1,227 hectares in 1974 to 2,124 hectares in 1984, or by 42 percent.

An acceleration in scientific-technical progress requires urgent solutions for a number of problems resulting from the level of production and the soil-climatic peculiarities of the republic. For the cultivation of stony and heavy soils, a need exists first of all for organizing the production of agricultural machines and units which will be suitable for work under the conditions found in our republic and also throughout the entire northwest region of the country.

In view of the comparatively high level of productivity of the dairy herd, hogs and poultry, in order to increase further the production of livestock husbandry products it will be necessary to ensure that the livestock are supplied with feed that is nutritionally balanced and especially in terms of its protein and amino acid content. This fact should be borne in mind when procuring internally produced feed and also when allocating resources for the republic's mixed feed industry.

Is the above meant to imply that the republic does not have problems or unused potential or reserves? Certainly, this is not implied. Reserves for further intensifying and raising the efficiency of agricultural production are seen in the following. First of all, there is the elimination of differences in

economic results between rayons and between farms within a rayon. As never before, the following slogan applies at the present time: backward farms should be raised to the level of average ones and average farms -- to the level of leading farms. The dissemination of leading experience can be of invaluable assistance in making use of this reserve. Material and technical resources, together with experience personnel, are making this task appear more realistic. Many reserves are to be found in connection with improving the utilization and storage of agricultural equipment, the use of transport, fuel, fertilizers and other material-technical resources and also in the extensive spread of intensive technologies for the cultivation of agricultural crops.

The elimination of disproportions in the development of the logistical base for production and in the processing of products -- this constitutes still another reserve. Importance is attached to accelerating the modernization and technical re-equipping of enterprises, the mechanization and automation of labor-intensive processes in branches of the processing industry, expanding the use of progressive forms and methods for carrying out procurements, transport operations and the storage and processing of agricultural raw materials and achieving reductions in all losses.

During a conference held in Tselinograd, emphasis was placed upon the fact that the principal element of concern, with regard to solving the entire chain of practical tasks confronting us, is that of organizing the production and work of kolkhozes and sovkhozes and all enterprises of the agroindustrial complex and ensuring the use of all available experience derived from highly productive and efficient work. Here everything is dependent not upon additional capital investments, but rather upon the work carried out by leading personnel and the party, soviet and economic organs.

In the case of our republic, this implies that the effectiveness of the economic levers must be intensified as follows: in accelerating scientific-technical progress, raising the effectiveness of capital investments, achieving a steady reduction in production costs and a proper ratio between growth in labor productivity and the payments for labor and introducing into operations on a more extensive scale collective forms for labor organization and stimulation.

Within the ESSR Ministry of Procurements, 78.3 percent of the production personnel have been converted over to the brigade method. However, the spread of this progressive form for the organization and stimulation of collective labor in agriculture is clearly inadequate and in the future it will be introduced into operations on a more extensive scale. In the future, taking into account the republic's conditions, a conversion will have to be carried out over to complete intra-organizational accounting.

The rate of growth in production slows down with an increase in intensity. Hence, a problem of intensive farms is that of improving the economic mechanism for them. It is our opinion that an important economic measure is that of converting over to the normative principle for planning agricultural production; the creation of a logistical base for the production of agricultural equipment that will be well suited for the conditions under which it will be used.

At the present time, it is possible to find the potential in ESSR Agroprom for establishing the series production of equipment developed in the various areas,

equipment characterized by highly efficient and reliable operation, and to organize in the future, in the northwestern zone and based upon design organizations and industrial enterprises available in this zone, a center for the development and production of machines and equipment, taking into account the local soil-climatic conditions.

Strengthening the logistical base for the agricultural science -- this reserve is associated mainly with the prospects for further development of the APK.

Scientists of the Institute of Farming and Land Reclamation have developed and are already introducing into production operations intensive technologies for the cultivation of grain crops which are making it possible to obtain a yield of 40-45 quintals per hectare. But the time is now at hand for assigning a new task and for raising the grain crop yield to 60-80 quintals per hectare, potatoes -- to 300-400 quintals per hectare and perennial grasses -- to 100-120 quintals of dry substance per hectare.

The Institute of Livestock Husbandry and Veterinary Science must solve the problem of scientific support for the breeding of highly productive cows having an average milk yield of up to 6,000 kg (the average milk yield for the republic at the present time is approximately 4,000 kg per cow, with the maximum yields surpassing 15,000 kg) and the breeding of bacon hogs which achieve a live weight of 100 kg in 165 days and with minimal expenditures of feed and labor.

We consider it advisable to have within the republic an institute for the mechanization and automation of agricultural operations; an inter-departmental scientific center for biotechnologies, which will make it possible to strengthen the base for the development of studies in the sphere of biotechnology and to expand substantially biotechnological production within the APK.

We consider our task to be that of achieving further improvements in the system for planning, organizing and carrying out scientific studies concerned with the development of the APK, raising the practical value of science to production, developing contractual relationships for the branch scientific-research institutes, planning-design and technological organizations and VUZ's with kolkhozes, sovkhoses and enterprises of the processing branches, increasing the dependence of the wages paid to scientific workers and specialists upon the final results and reducing the schedules for introducing highly effective scientific developments into production operations.

One large reserve is that of raising the operational level of agroindustrial associations in connection with the formation and practical implementation of the plans for the development of science and engineering and all-round inter-branch programs, the extensive use of intensive resource and energy-conserving ecologically acceptable technologies, achieving advance development for the logistical base for support-demonstration and experimental farms and the active introduction of foreign and domestic experience into leading practice.

ESSR Agroprom, guided by the decisions of the April (1985) Plenum of the CPSU Central Committee and instructions handed down during a meeting in the CPSU Central Committee on the problems of scientific-technical progress, is undertaking energetic measures aimed at expanding and increasing the scales and

rates for scientific-technical progress, ensuring that all branches of the agroindustrial complex achieve leading scientific-technical positions as rapidly as possible and increasing the responsibility of kolkhozes, sovkhoses, enterprises and organizations for the timely mastering of new innovations. All of the necessary conditions are being created throughout the republic for ensuring the active utilization of the initiative and creativity of the labor collectives and the potential of the socialist competition for preparing in a worthy manner for the 27th CPSU Congress, in the interest of accelerating production intensification and raising its effectiveness in all branches of the APK and the unconditional fulfillment of the tasks of the Food Program.

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[Article by G. Mgeladze, Chairman of the Georgian SSR State Committee on Agricultural Production: "A Single Administration for the Agrocomplex"]

[Text] The main direction in dealing with the Food Program involves persistent work by the party and all the people to further develop agriculture and the agroindustrial complex in its entirety.

--M. S. Gorbachev

The development of a progressive form of organization and wages--collective contracts--is only a portion of that great comprehensive work to improve the economic mechanism without which further growth in effectiveness of agricultural production is impossible. It was this aspect of the question that was given special attention at the April 1985 Plenum of the CPSU Central Committee by M. S. Gorbachev. "Not everything by far has been done," he emphasized. "If we are firmly convinced of the fact that there should be a single administrator for land and that agroindustrial associations bear full responsibility for the fulfillment of the Food Program, of which we feel there is no doubt, then it follows that measures should be implemented which will enable us to manage, plan and finance the agroindustrial complex as a single unit at all levels."

The agroindustrial complex as an independent planning and management object was isolated for the first time in our country in the decisions of the May 1982 Plenum of the CPSU Central Committee. The possibility has arisen to tie together the tasks of the basic as well as service links of agricultural production and to create a common interest in the end results of labor.

As long ago as 1974 the Abashskoye Rayon Association, to which all enterprises and services related to agriculture and the processing of its products as well as sovkhoses and kolkhoses have been subordinated, was created in Georgia. For the first time, a territorial interbranch administrative organ began functioning in the republic; it was assigned the following tasks--to manage the agroindustrial complex, to be responsible from beginning to end for the growth of production and procurement of agricultural products and to

contribute to the elimination of interdepartmental separateness, to increase the interest of all partners in end results and to effectively use fixed capital and financial and labor resources.

Many years of work experience by the association showed that an effective, integrated apparatus has been created in Abashskiy Rayon for managing agriculture and related production branches; this apparatus provides the opportunity to carry out a uniform economic policy, directed at obtaining a maximal return for the entire rayon from the land, from the resources invested in it and from material and labor resources. Similar administrative links have been created in all of Georgia's rayons since December 1981.

The introduction in the rayon link of a new management form is based on the necessity for restructuring on the republic level as well. In February 1983 the Georgian SSR State Committee on Agricultural Production (GSSR Goskomselkhozproduktstvo) was created on the base of the republic's Ministry of Agriculture, the Ministry of Land Reclamation and Water Management and Goskomselkhoztekhnika [State Committee of the Agricultural Equipment Association]. In a similar manner corresponding committees have been created in the Abkhaz and Adzhar ASSR's, as well as the South Osetian Oblast Agroindustrial Association; the structure and functions of the RAPO [Rayon Agroindustrial Association] have also been brought into line. In its operations, GSSR Goskomselkhozproduktstvo is subordinate to the Georgian SSR Council of Ministers as well as to USSR MinSelkhoz [Ministry of Agriculture], USSR MinVodkhoz [Ministry of Land Reclamation and Water Resources] and USSR Goskomselkhoztekhnika as concerns questions that these organizations are competent to deal with. As regards the RAPO, it is the direct higher organ which bears full responsibility for the state of agricultural production.

The creation of a state committee provided the opportunity to eliminate multiple departmentalism and separateness in administration and services, existing parallel operations and duplication, excessive regulation of the operation of kolkhozes and sovkhoses and a strengthening of administration to the detriment of economic administrative methods.

The central apparatus of the state committee was formed from 34 independent subdivisions instead of the 72 in abolished ministries and departments. Its total number has been curtailed by 10 percent. The committee is headed by a chairman who has two first deputies and eight deputies instead of the three ministries and 21 deputies in ministries and departments on the base of which it was created. In GSSR Goskomselkhozproduktstvo a board was formed, the resolutions of which must be fulfilled on an obligatory basis by the apparatus of the state committee and by the system's associations, enterprises, organizations and institutions.

As a result of the restructuring of management organs from service enterprises and organizations, over 900 management and engineering-technical workers have been freed; they have been reassigned to work directly in kolkhozes and sovkhoses and in part to strengthen the RAPO apparatus.

Following the unification of agricultural, engineering and reclamation services and several other subdivisions, over 70,000 units of equipment were

concentrated within the system of the state committee. Building and installation work worth 100 million rubles is being carried out using its own resources; auxiliary trades and fish breeding, where production has already exceeded 200 million rubles, are also being developed further. Thus, the organization of agricultural production, its servicing, building and agrarian science are concentrated in the hands of a single organ. Favorable conditions have been created for the more complete utilization of existing production-economic potential and resources and the management of agricultural production and its service spheres has been systematized at all levels.

Within Goskomselkhozproduktstvo a single engineering service has been created. Main administrations for operating the machine-tractor fleet, for repairs and technical services, for the mechanization of livestock raising and for the electrification of agriculture, a technical observation point as well as an administration on quality have been created within the committee's central apparatus. The committee's deputy chairman acts as administrator of the entire engineering-technical service.

A single engineering service in the rayon agroindustrial association (RAPO) includes the engineering-technical services of all subdepartmental farms, enterprises and organizations. This service is managed by corresponding functional divisions and RAPO management groups. The RAPO first deputy chairman, who heads the engineering service, has been given extensive rights and is responsible for its stable operation, for a high level of technical readiness, for its effective use in general for the situation in service enterprises as well as kolkhozes and sovkhoses.

In the engineering service of the rayon link an important role has been assigned to the enterprise on the repair and operation of the machine-tractor fleet. Concentrated in it are powerful tractors to perform energy-consuming mechanical operations in kolkhoz and sovkhos production. The planning system involving the repair of agricultural technology has been cardinally restructured. As a result, there was a noticeable increase in the readiness of the tractor and automobile fleet.

Material-technical supply, which includes 20 supply organizations of which three are republic and 17 are interrayon supply bases, has been transferred to the system of GSSR Goskomselkhozproduktstvo. This service is headed by the recently-created republic association, Gruzselkhozsnab [Georgian Agricultural Supply Association].

The main organizational principle of the material-technical supply system operating in the state at present is that after examination by the board of the state committee, material resources are divided among RAPO's and are at their disposal. Specialized repair enterprises and other organizations, which have been given the task of carrying out general branch functions, receive material resources according to a centralized system.

With the transfer of all funds for material-technical resources to the RAPO it has become possible to carry out a single policy in the area of material-technical supply of agricultural production as well as to plan the repair and technical servicing of the means of mechanization and electrification with a

consideration of the orders made by enterprises, the available fleet of motor vehicles and the existing order for using spare parts and materials. The new system frees the enterprise from concerns about acquiring material-technical resources and achieves the timely delivery of agricultural equipment to the enterprise. Today, sales bases supply kolkhozes and sovkhoses with resources as they come in without waiting for payment in accordance with a supply plan that has been confirmed by the state committee. The centralized delivery of equipment yields a savings of up to 3 million rubles annually to enterprises and frees directors and specialists from the function of "go-getter," which is alien to them.

Significant changes have also occurred in the organization of the motor transport service. Instead of uncoordinated and small motor transport enterprises belonging to different departments, large motor transport enterprises have been created in rayons, thereby enabling us to curtail administrative-management personnel and to improve the use of motor transport. All motor transport has been divided into three categories. The first includes the technological motor vehicles of kolkhozes, sovkhoses and other agricultural enterprises. The second includes rayon ATP [Motor transport enterprises] created by means of merging three motor vehicle enterprises of three abolished departments. The third includes large motor transport associations for 950 motor vehicles in Tbilisi and for 300 in Tskhaltubo, which are under the administration of the committee.

In order to implement the unified management of the entire motor transport service, including the motor transport of kolkhozes and sovkhoses, a cost-accounting production association called Gruzselkhoztrans [Georgian SSR Agricultural Transportation Association] has been created within the system of GSSR Goskomselkhozproduktstvo; it also has the functions of planning and organizing railroad shipments. Here the corresponding subdivisions and individual posts within the central apparatus of the state committee, totalling 50 persons, were abolished. Created within Gruzselkhoztrans were 42 motor transport enterprises and associations with independent balances, including 26 enterprises subordinate to the RAPO. Measures are being taken for the continued strengthening of the production-technical base of motor transport.

The reclamation service has also been restructured. Irrigated and drained lands comprise 18 percent of the total area of agricultural lands in the enterprises of Goskomselkhozproduktstvo, whereas the volume of gross production output from farming on reclaimed soil is about 45 percent. This attests to the important role of the reclamation service in achieving good results in agricultural production. Within the central apparatus of GSSR Goskomselkhozproduktstvo this service is represented by two large structural subdivisions--the main administration for operations and reclamation work and the main administration for the integrated assimilation of reclaimed lands. In territorial-administrative formations on the base of the corresponding organizations of the republic's former Ministry of Land Reclamation and Water Management we have organized 38 rayon, eight interrayon and the Abkhaz, Adzhar and South Osetian production administrations of land reclamation and water management. Corresponding departments or groups have been created within the apparatus of the RAPO administration, and in large rayons the position of RAPO



deputy chairman for reclamation has been created. The first deputy chairman of the state committee is in charge of the entire reclamation service within the committee system.

In accordance with the decisions of the October 1984 Plenum of the CPSU Central Committee on questions of reclamation, the nature of operations of the service have also been altered. Whereas previously the service was responsible only for the operation of main channels, water management structures and the delivery of irrigation water to the gates of enterprises, now together with the water consumer the service bears the responsibility for the condition and operation of the intraenterprise network, for the efficient use of water and for the harvest on reclaimed lands. The intraenterprise network has been accepted for technical services everywhere. This work is carried out by rayon production administrations for land reclamation and by specialized sections of interr rayon administrations, which conclude contracts with kolkhoses and sovkhozes. The measures taken have achieved increased efficiency in the service in preparing reclamation systems for the irrigation season and in carrying out all water management operations on schedule and with good quality.

In order to improve capital building and to strengthen management by contract organizations in the village, the republic interkolhoz building association, Gruzmezhkolhozstroy [Georgian Interkolhoz Building Association] has been subordinated to the administration of GSSR Goskomselkhozproduktstvo. In connection with this, the structural subdivision on building within the central apparatus of the state committee has been transformed into the main interenterprise administration of capital building. Also joining its ranks is the outfitting administration of the former Goskomselkhoztekhnika, which enabled us to more efficiently deal with questions of outfitting objects that are under construction or already in operation. In order to more effectively utilize resources during building and capital repair of buildings and structures with a cost of up to 100,000 rubles, repair-building trusts attached to the committee have been created to manage the work of the repair-building administrations. Practical experience shows that the building of such objects using one's own efforts and local materials is faster and much more inexpensive.

Improvements in administration are unthinkable without a strengthening of the economic service and of the regulation of economic interrelations between agricultural and service enterprises. The creation of the committee established favorable conditions for improving planning in general. The activities of service organizations are now planned on the basis of the interests of agricultural production. In connection with the abolition of three departments, their subdivisions, which deal with questions of planning, the economy, finances, production organization, wages, and accounts and recordkeeping, have been unified into corresponding single structural subdivisions within the committee's central apparatus. The economic services in state committees of the autonomous republics and in oblast and rayon agroindustrial associations have been improved in a similar manner. With the goal of improving the economic analysis of economic-financial operations of enterprises and organizations, a Center of Economic Analysis and Forecasting has been created.

For the first time, the position of deputy chairman on economic questions has been introduced within the structure of the RAPO apparatus. He organizes and directs the work of functional departments--planning-economic, bookkeeping and accounts, interbranch relations as well as the control-revision group.

A new, more efficient economic mechanism, which regulates relations between kolkhozes and sovkhozes and enterprises from the service sphere and which is based on contracts, has been developed. It integrally ties together the economic interests of kolkhozes and sovkhozes with the interests of repair, reclamation, motor transport, supply, agrochemical and other enterprises, and raises the responsibility of collectives for improving the quality of jobs and services and for adhering to schedules in fulfilling these services. Contractual economic relations are based on the material interest of workers of service enterprises to achieve the end results of the operations of enterprises--growth in production and procurement volume and improved quality of agricultural products. The better they fulfill contractual obligations, the greater their bonus at the end of the year and the more additional grain, potatoes, vegetables, fruits and coarse feeds they will be issued as a reward for conscientious labor.

The administration for agricultural science and for the introduction of achievements of scientific-technical progress into production has been restructured in the republic on an experimental basis. The Transcaucasus division of VASKhNIL [All-Union Academy of Agricultural Sciences imeni V. I. Lenin] has been assigned, in dual subordination, all republic scientific institutions with an agricultural profile. General and scientific-methodological management of these institutions has been assigned to the presidium of the division, the chairman of which is simultaneously the deputy chairman of the Committee on Scientific-Technical Progress. The Transcaucasus VASKhNIL division has been given the functions of a single coordinating center bearing full responsibility for the introduction into production of the elaborations of subdepartmental scientific institutions as well as of the recommendations of leading native and foreign science.

Taking into account the importance of the timely introduction of scientific achievements into practice, divisions or groups on scientific-technical progress which follow a single policy on this matter have been created within the RAPO apparatus. Together with directors and specialists of RAPO branch subdivisions they are organizing the work of introducing progressive innovations in kolkhozes, sovkhozes and other agricultural enterprises and they share with them the responsibility for production-economic effectiveness resulting from the introduction of these innovations. The position of deputy director for questions related to introducing the achievements of scientific-technical progress into production has been established in all agricultural enterprises; this position is directed totally at achieving great results from the innovations utilized in enterprises.

Resolutions dealing with a single comprehensive republic system of implementation have been developed and confirmed at all levels. A plan to introduce specific scientific elaborations during specific years of the five-year plan has been assigned to enterprises. In 1984 the economic

effectiveness of implementing this plan equalled 63 million rubles, which is several times more than in preceding years. For example, about 1 million rubles were received last year in the enterprises of suburban Gardabanskiy Rayon as a result of the utilization of scientific recommendations. The utilization of a production technology employing wastes from hogbreeding as raw materials already today yields 5 rubles profit per ruble invested at the Krtsanisskiy Complex although only 10 percent of capacities have been assimilated in this enterprise that is still under construction. In the enterprise this raw material is used to make feed supplements, the use of which allows us to save 40,000 rubles in the fattening of every 1,000 hogs. These innovations, which have not only an economic but an ecological significance, were proposed by Tbilissi State University. This also reflects the manifestation of a characteristic feature of a single comprehensive system of implementation--the Transcaucasus VASKhNIL division coordinates not only the work of institutions of agricultural science but also branch thematics at all of the republic's scientific subdivisions.

Increasing the material interest of scientists and producers in introducing the achievements of scientific-technical progress is facilitated by the employment for this purpose of material stimulation on the basis of the economic effectiveness of implementing innovations.

An improvement in the administration of agricultural production in the republic has a very noticeable effect on the results of operations of kolkhozes and sovkhozes. During the last 2 years gross branch production increased by 13 percent and surpassed 1 billion rubles. There has been growth in the productivity of agricultural crops and of animals. For the first time the profits plan has been overfulfilled and the number of unprofitable enterprises has been decreased to a minimum--there were 386 and only 36 remain. During this period production profitability increased by 11 percent. Balance profits of enterprises and supply bases more than doubled. Output per standard tractor increased by 14 percent.

Life has convincingly proven that the development of agricultural production was being hindered primarily by two factors--departmental separateness and the absence of a single manager on the land. Thus the purpose of integration consists of creating an organ of agricultural administration that will not only eliminate these factors but that will in its very essence be vitally interested in and capable of solving those tasks involving the organization of kolkhoz-sovkhoz production, which abolished enterprises were previously not up to.

It is no secret that any new matter gives rise to many arguments and discordant opinions. This happened here as well. The main misgivings expressed during the integration of the three departments concerned that fact that if the old, albeit not totally adequate mechanism is destroyed while the new one is being created and smoothed out, especially when we do not know how effective the new one will be, the situation will undoubtedly suffer. We feel it is possible to announce with full responsibility that under the new management conditions, agricultural production in the republic has not suffered in the least. Even if we do not keep in mind the apparent advantages of integration, there can be no doubt that when one administrative organ is

created out of three it becomes easier to operate on a local level and to find someone to bear the responsibility on a central level. This is why now in our republic no one has any doubts that the reorganization that was undertaken was not only expedient but essential as well. Integration created the opportunity to improve the planning system, to centralize material, technical, financial and labor resources and most importantly, to transform interdepartmental problems into intrabranh problems. This enables us to efficiently make decisions which previously required the participation of directive organs, and efficiency often has a principal effect on the fate of the harvest.

Questions related to the development of the branches within the agricultural complex have occupied a special place in the work of the committee. Working groups which prepare specific programs for each branch and submit them to the board for examination, were created with the participation of representatives of science.

Among workers of the republic's agroindustrial complex a form of democratization of management--the general republic television selector conference--is widely known. The implementation of such conferences has confirmed their indisputable usefulness. Of course, this is not a complete list by far of the innovations the committee is striving to employ in its work. At the same time, we must acknowledge that not all administrative questions are being solved in the best way as of yet. Thus, an improvement in work style and methods will continue to be one of our main tasks.

While restructuring the administrative system in agriculture we understood well that the center of all organizational work must be transferred to the rayon link, which is a decisive factor in agricultural production. The integration of three departments gave rise to the necessity to further improve management of this link. After long and drawn-out elaborations and studies at all levels, a draft for a rayon agroindustrial association fully coordinated with the state committee structure and with the principles of territorial and branch management was passed. On its basis and with a consideration of regional characteristics and economic indicators, a structure and staff were developed for every RAPO separately.

The essence of the new management structure for the rayon agroindustrial association, as in the formation of the committee, has to do with the fact that interdepartmental questions have become intrabranh problems. Here a mechanism has been built in which forces directors of engineering and other services not only to be concerned about positive changes in all of the kolkhozes and sovkhoses of the rayon but also to be responsible for the actual situation as a whole.

I can say with certainty that at the present time on the rayon level in agricultural production there are no problems for the solution of which the RAPO does not have the necessary services, strengths and resources. With the formation of a new structure for RAPO management the development of a single administrative mechanism has been completed along the entire vertical line from top to bottom.

At the same time, work practice under the new conditions demonstrated that although the creation of the RAPO was an indisputable step forward on the part of the administration of agricultural production, in general this task still has not been finally resolved. How can the RAPO successfully manage the enterprises and organizations which are a part of it if each one of these has its own central administration, its own departmental indicators, and its own system of planning and material-technical supply, all of which are often not coordinated with regional interests? It is no secret that the building of the meat combine, the tea factory, the canning plant and other enterprises is planned first and foremost according to the branch principle whereas the territorial factor bears, let us say openly, a formal and symbolic nature. With regard to these enterprises the RAPO essentially does not have at its disposal real management leverage or effective economic mechanisms.

From our point of view there is only one solution to the problem. Either all interested organs in the near future and by means of joint efforts create an effective economic mechanism for interrelations between the RAPO and enterprises with double subordination, meaning first and foremost a single production-financial plan, or the RAPO will be a competent management organ for the agricultural association alone at any given level and will build relations with all other enterprises on a partnership basis.

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AGRO-ECONOMICS AND ORGANIZATION

ROLE OF KOLKHOZ, COOPERATIVE SECTOR WITHIN TAJIK APK

Dushanbe SELSKOYE KHOZYAYSTVO TADZHIKISTANA in Russian No 8, Aug 85 pp 31-36

[Article by Prof T.M. Mir-Akilov, doctor of economic sciences; and Docent (Tajik Agricultural Institute) R.R. Yatimov, candidate of economic sciences: "The Development of Socialist Ownership Under the Conditions of the Agrarian-Industrial Complex"]

[Text] Public ownership of the means of production serves as the basis of the entire system of production relations. The theoretical conclusions of the 26th CPSU Congress concerning the possibility of the merger of the state and kolkhoz-cooperative forms of socialist ownership and the coming into being of a classless structure of society within the historical framework of socialism are of paramount scientific significance.

V.I. Lenin characterized state enterprises as enterprises of a "consistently socialist type".\* Thus V.I. Lenin regarded state (nationwide) ownership as an economically higher, more mature form of socialist ownership most adequately reflecting the social nature of the contemporary production forces and their development trends and ultimately determining the socialist nature of the cooperative form of ownership itself.

Compared with the nationwide sector of production the kolkhoz-cooperative sector of the economy represents a relatively less high level of socialization of production. The socialist nature of both forms signifies their unity, while the different degree of maturity constitutes the contradictions between them. In this connection the main task is the creation of the conditions for their full homogeneity.

A specific feature of the manifestation of socialist production relations in the Tajik SSR is the fact that the relative significance of kolkhoz-cooperative ownership is higher here than in the USSR as a whole. Thus the relative significance of production capital in the state sector in the USSR national economy constitutes approximately 90 percent, but in the TaSSR 81.2 percent. In the USSR the working class constitutes 61.2 percent of the population, while kolkhoz members and cooperativized craftsmen constitute 12.9 percent. In the TaSSR these figures constitute 53 and 26.3 percent respectively.

\* V.I. Lenin, "Complete Works," vol 45, p 374.

These specific singularities have been reflected in the sphere of circulation also. The proportion of cooperative trade in total retail commodity turnover in the USSR constitutes 24.8 percent, but in the TaSSR approximately 50 percent.

In 1983 those employed in social production constituted 46.9 percent of the total population in the USSR, but 29.2 percent in the TaSSR.

The proportion of persons unable to participate in social production is relatively high in Tajikistan. This category constitutes 55 percent of the total numbers of those employed in the Central Asian republics.

Women constitute the bulk of those employed on the private subsidiary farm. This also is reflected in the degree of maturity of directly social production and labor. It is well known that work on the private subsidiary farm is inseparable from the socialist system of the economy and social production. This farm is based on the private labor of the kolkhoz members, workers and employees. The private subsidiary farms are an additional source of the production of agricultural products. However, the contradictions connected with the existence of this category of farm cannot be denied. The point is that it is useful as a subsidiary farm; if, however, the latter becomes the main source of income and is based on a redistribution of the national income via the market, the action of the economic laws of socialism, including distribution according to labor, is impeded.

The main direction of development is an increase in the role of nationwide ownership. Whereas in 1965 the relative significance of the republic's sovkhozes in the fixed capital of public agriculture constituted 24.8 percent, in 1982 it constituted 57.6 percent. Of all workers employed on the kolkhozes and sovkhozes, the latter accounted in these same years for 9 and 45.6 percent respectively.

In the future the development of the food sectors of agriculture will increase to an even greater extent the share of sovkhoz production in the gross agricultural product.

The growth of the state sector in agriculture will be accompanied by an improvement in kolkhoz-cooperative ownership and the process of their rapprochement.

Studying the prospects of the rapprochement of the kolkhoz-cooperative form of ownership and the nationwide form, the CPSU Central Committee June (1983) Plenum observed that it would consist of the merger (not mechanical, of course) of these two forms into a single, nationwide form.

The rapprochement of the two forms of socialist ownership is a multifaceted and complex process encompassing the entire structure of relations from top to bottom under the direct regulating impact of the socialist state. As experience testifies, the juridical act of converting kolkhozes into sovkhozes without the proper economic prerequisites does not always produce the anticipated results. After all, many of the republic's kolkhozes are running the public farm no worse and frequently even better than the sovkhozes.

The purely quantitative increase in state ownership at the expense of the kolkhoz-cooperative sector is not an end in itself but a means toward economic upsurge and an increase in the degree of maturity of socialist agrarian relations. The course of the CPSU's agrarian policy proceeds from the need for the development of the sovkhozes and kolkhozes, the consolidation of small farms, the industrialization of farming and animal husbandry and an expansion of the scale and acceleration of the upsurge of cooperation to the level of socialization corresponding to the relations of nationwide ownership.

In the immediate future there will be a sharp increase in the production of Tajikistan's agricultural product against the background of the actual stabilization of its main sector--cotton growing. In the immediate future also the main producers of raw cotton will be the kolkhozes. Their relative significance in cotton production is to be great still. The number of kolkhozes and their average size will be stable. The efficiency level will rise.

The kolkhozes will also play a big part in the production of animal husbandry products. On the cotton-growing kolkhozes with the best conditions for zootechnic and veterinary work it will be possible to provide for the transition of the fattening and rearing of young replacement stock to an industrial footing and the extension of production specialization.

Livestock raising for meat may be developed on such kolkhozes by way of the rearing of heifers on the farms themselves.

A most important direction of the development of kolkhoz ownership is inter-farm cooperation.

#### Composition of the Republic's Interfarm Enterprises

	Number	In which are		
		Kolkhozes	Sovkhozes	Industrial enterprises
Total interfarm enterprises	54	298	56	2
Interfarm enterprises of which only kolkhozes are partners	30	180		
Interfarm enterprises of which only sovkhozes are partners	1		11	
Interfarm enterprises of which kolkhozes, sovkhozes and other enterprises are partners simultaneously	23	118	45	2
Several participation at the end of the year, rubles				
of kolkhozes	68,836			
of sovkhozes	6,945			

It can be seen from the table that kolkhoz ownership predominates in the interfarm enterprises. The several participation of the kolkhozes in the resources of the interfarm enterprises constitutes 90.5 percent.



It should be noted that the process of interfarm cooperation has not as yet been sufficiently developed in the kolkhoz sector. As of 1 January 1984 only 62 of the 158 kolkhozes were participating in the various forms of interfarm cooperation.

In 1982 the proportion of interfarm enterprises in the gross agricultural product constituted 2.1 percent, including 6.8 percent in animal husbandry and 0.8 percent in plant growing. This testifies to the insufficient level of socialization of production.

Modern scientific-technical achievements are affording real opportunities for ensuring the industrial production of agricultural products with the optimum size of the farms. Practice has shown that both small-scale works which fail to correspond to the level of development of modern equipment and technology and giants which are uneconomical in operation and inefficient both for the producer of the product and for the consumer are economically unjustified.

The development of interfarm cooperation and agrarian-industrial integration presupposes the removal of economically unwarranted comminution and an increase in the end results and the efficiency of the agrarian sector. Yet the construction in the republic of giant animal husbandry complexes, a noncomprehensive approach to investments and the lack of the corresponding investments in the formation of a highly productive herd and a strong fodder base have led to disproportions and a sharp decline in the efficiency of production.

V.I. Lenin taught that the emergence of new forms of socialization did not already signify real socialization. For real socialization it is essential that the production techniques, economics and management correspond to these new forms. The latter must be suffused with the technological, economic and organizational forms appropriate to them. In practice, however, the new forms of socialization frequently represent a mechanical, formal unification of brigades, farmsteads and farms without an extension of specialization and an improvement in the organization and techniques of production. This is a principal reason why the qualitative indicators of the interfarm enterprises are growing insufficiently rapidly.

The creation of interfarm enterprises of a horticultural-viticultural direction has a great future. It is contemplated developing such enterprises at an accelerated pace in Leninabad Oblast and the Gissarskaya Valley.

The merger in the future of the two forms of socialist ownership into a single nationwide form will depend not only on the level of socialization of kolkhoz production or equalization of the levels of development of production in the kolkhoz and state sectors of agriculture but also on the level of socialization in production in industry and agriculture as a whole.

The process of agrarian-industrial integration has not as yet enjoyed sufficient development in Tajikistan's kolkhoz sector. Thus there were 272 subsidiary industrial enterprises on the kolkhozes in 1983. The average annual numbers of workers in them constituted 2,065.

Agrarian-industrial integration is proceeding inadequately in the state sector also. Data pertaining to the republic's Ministry of Fruit and Vegetable Industry are characteristic in this respect.

Thus in 1983-1984 it incorporated 101 sovkhoses, 16 industrial and more than 20 trading enterprises and 4 motor transport and 8 construction organizations. The proportion of industrial workers in the total numbers of workers of the said enterprises constitutes 12.3 percent, while the relative significance of industry in these enterprises' fixed production capital constitutes 9.3 percent, while for agriculture these indicators constitute 80.9 percent and 83.05 percent respectively.

The picture is the same for the subsidiary industrial enterprises of the sovkhoses of the republic's Ministry of Fruit and Vegetable Industry. The proportion of workers employed in the subsidiary industrial enterprises in the overall numbers of workers of the sovkhoses constitutes 0.8 percent, while these enterprises' proportion of the sovkhoses' fixed production capital constitutes approximately 6 percent. For sovkhoses of the republic Ministry of Agriculture these data constitute 1.8 and 2.6 percent respectively.

Cooperativization should be accompanied by a sharp upsurge of industrial production in both sectors of the national economy. The process of agrarian-industrial integration not only in the state sector but in the kolkhoz-cooperative sector also should intensify on this basis. The creation of mixed state-cooperative enterprises is inseparably connected with this. Tajikistan does not as yet have a single interkolkhoz-industrial or state-kolkhoz enterprise for the processing of agricultural products.

The rise in the end result of the functioning of the agrarian-industrial complex is connected with a considerable limitation of the list of operations performed in agriculture and their transfer to industry and procurement and trading organizations of a nonfarming profile. This is the general regularity. But the specific conditions of the republic (the labor surplus in the countryside and the substantial proportion of the kolkhoz-cooperative sector and the private subsidiary farm sector) demand, as shown above, the location of industry closer to the countryside, in small communities and so forth. Great importance in this respect is attached to the processing of agricultural raw material not only in state-kolkhoz enterprises but also in interfarm enterprises (for the treatment of raw cotton, interkolkhoz formula food plants and so forth).

A significant step along the path of the rapprochement of kolkhoz-cooperative and nationwide ownership and the transition to a single form of farm is the development of rayon, oblast and republic agrarian-industrial associations. In the rayon agrarian-industrial association (RAPO) state and kolkhoz-cooperative ownership functions jointly.

The internal structure of the cooperative sector is heterogeneous. It incorporates, besides the kolkhoses, consumer cooperatives in the trade sphere, fishing kolkhoses and housing-utility cooperatives. The relative significance of the retail commodity turnover of the country's cooperative trade in 1980

constituted 27.4 percent, but in the TaSSR 49.1 percent. In connection with the fact that the kolkhoz-cooperative sector in our republic is of considerable relative significance the consumer cooperatives will retain their significance for a long time also. The development of the latter in recent years has been conditioned largely by their participation in solution of the country's Food Program. The consumer cooperatives should increase their assertiveness in improving social-everyday living conditions in the countryside, developing the population's private subsidiary farms, assimilating local food resources, expanding the trade in the cities in agricultural products and improving the use, storage and processing of the products of the fields and truck gardens.

The creation of the RAPO is extending the traditional relations of the consumer cooperatives with the kolkhozes, sovkhoses and other partners of the agrarian-industrial complex. The development and strengthening of new forms of liaison, interaction and integration are taking place, first, at the junctions of state and cooperative forms of ownership, second, between kolkhozes and consumer cooperative organizations, third, between consumer cooperatives and horticultural-truck garden cooperatives and, fourth, between consumer cooperatives and the private subsidiary farms.

The consumer cooperatives are called upon to play a significant part in an increase in the degree of socialization of the individual sector of socialist agriculture. As mentioned above, the public forms of socialist ownership predetermine the essence, place and nature of private ownership.

The consumer cooperatives should contribute to an increase in the production of products on the private subsidiary farms by way of rendering production assistance, providing these farms with resources, selling them young stock and poultry, feed and fertilizer and construction materials, purchasing agricultural commodities at agreed prices and so forth.

In the TaSSR the share of private subsidiary farms in the overall production of vegetables constitutes 48.2 percent, melons 54.6 percent, potatoes 39.3 percent, grapes 40.4 percent, milk 48 percent, meat 36 percent and fruit 62.3 percent.

The successful fulfillment of the Food Program demands together with a high rate of development of the public farm of the kolkhozes and sovkhoses that serious attention also be paid to the development of the population's private subsidiary farms. Currently almost one-third of the farmsteads of the republic's kolkhoz members and sovkhos workers lacks cows, while more than 15 percent of the kolkhoz members' farmsteads keep no livestock at all. The point is that in some places the kolkhoz members and sovkhos workers, having sufficient earnings in social production and an opportunity to acquire the food products they need on the kolkhoz and sovkhos or in the state store, have essentially not begun to take up private farming.

In the future an increase in the production of products on the citizens' private subsidiary farms should occur mainly thanks to intensive factors--an increase in the yield of agricultural crops and the productiveness of the animals.

The extensive application in the TaSSR of such forms of cooperation of the private subsidiary farms as the sale to the population of young stock, the provision of these farms with fodder and the organized purchase from them of agricultural products is contributing to the private subsidiary farms' organic incorporation in the uniform national economic complex and the conversion of the labor on the private subsidiary farm to a variety of social labor. As this process develops, the level of maturity of both forms of socialist ownership will determine the degree of socialization of labor on the private subsidiary farms also.

The specific singularities of the development of public ownership under the conditions of the republic's agrarian-industrial complex should be reflected in its economic mechanism also. The greater the relative significance of state ownership, the more the opportunities for each worker to obtain material and spiritual benefits in accordance with the quantity and quality of his labor. The economic mechanism of the agrarian-industrial complex should be geared primarily to realization of this principle and a strengthening of the socioeconomic homogeneity of different classes and social groups. It is necessary to proceed here also from the fact that the relative significance of kolkhoz-cooperative ownership is appreciable in the republic's agriculture, particularly in the cotton subcomplex. This has to be taken into consideration at the time of the final formation of the economic mechanism of control of the republic's agrarian-industrial complex.

The appropriate bodies of the agrarian-industrial complex should concern themselves with an improvement in the forms and methods of socialization of production, the socioeconomic development of the enterprises of the different sectors and problems of a rise in the living standard of different social strata of the population.

The specific singularities of the development of socialist ownership should also be taken into consideration in the functioning of the RAPO. It is essential in this new component of management to perfect the mechanism of the interaction, rapprochement and integration of the two forms of socialist ownership and a rise in the level of the socialization of production on the private subsidiary farms.

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## TILLING AND CROPPING TECHNOLOGY

### INCREASED CULTIVATION OF DURUM WHEAT URGED

Moscow ZAKUPKI SELSKOKHOZYAYSTVENNYKH PRODUKTOV in Russian No 10, Oct 84 pp 29-30

[Article by I. Yelagin, doctor of agricultural sciences: "There Must Be More Durum Wheat"]

[Text] Durum wheat has been famous for its excellent qualities for a long time and is rightfully called the pearl of grain crops.

Durum wheat varieties developed in the last few years possess high technological properties with a potential productivity of 40 to 45 quintals of grain per hectare under conditions of natural moistening and of 50 to 60, under irrigation and an overall resistance to such diseases as loose smut, powdery mildew, different types of rust and the most dangerous pests. It is especially important that the developed varieties possess a high resistance to brown rust and loose smut, whose causative agents are most aggressive under irrigation conditions.

The availability of spring and winter durum wheat varieties possessing a set of economically valuable properties is of great importance for an increase in the production of the grain of this food crop. However, during their cultivation a decisive role is assigned to the scientific agrotechnical complex ensuring the production of high stable harvests of high-quality durum wheat grain under industrial conditions.

Under conditions of proper agrotechnology many farms annually obtain high stable harvests of durum wheat with a content of more than 34 percent of gluten and about 20 percent of crude protein in grain. If possible, its sowings are placed on virgin and long-fallow land, a perennial grass sod and clean fallow. At the same time, such valuable predecessors as winter rye, corn for green fodder and silage, buckwheat, millet, pulse crops and oil-producing flax are utilized widely.

In connection with the total growth of the yield of grain and other crops the removal of nutrients from soil increases accordingly. Therefore, with due regard for soil fertility after every predecessor, especially on old land, it is necessary to apply organic and mineral fertilizers in certain doses and ratios. At the same time, it is possible to increase the grain yield by more

than 3 to 4 quintals and the content of crude protein in it, by 3 to 4 percent. As long ago as 1882 P. A. Kostychev wrote the following in the book "Obrabotka i udobreniye chernozema" [Tilling and Fertilization of Chernozem]: "Cultivation of durum wheats should not be limited to regions, where there is new land and old idle land is possible. We can enrich our soft chernozem soil with nitrogen and sow durum wheats on it." This is confirmed by the data of state strain testing plots and the practice of many farms.

On strain testing plots in Orenburg Oblast durum wheat forms high-quality grain when its sowings are placed on old land, that is, fallow, corn and winter crops, which is evident from the data of the table.

Table. Quality of Kharkovskaya-46 Durum Wheat Grain Depending on Various Predecessors (1978)

Strain Testing Plots	Predecessor	Mass of 1000 Grains (g)	Volume-Weight (g/l)	Glassiness %	Crude Gluten
Totskiy	fallow	55.3	823	99	36.8
"	corn	47.9	801	90	34.9
"	winter crops	43.2	815	99	37.6
Alekseyevskiy	perennial grass	40.8	803	94	33.7

Durum wheat must not be sown after cereal crops, because this causes a mass spread of the floral mite. The infestation of crops by this mite reduces the harvest and has an adverse effect on grain quality.

Scientific and production data show that, when the sowings of durum wheat are located on soft land, especially on fallow, a 17-percent protein content in grain is ensured, plants are affected less by root rots and the floral mite and blind seed disease is eliminated, which is very important.

In the process of soil cultivation it is necessary to ensure the greatest accumulation and preservation of moisture. Organic and mineral fertilizers contribute in large measure to an increased content of protein in grain. Fertilized wheat consumes water more economically and is resistant to drought. At the same time, its yield and the quality of grain rise.

With due regard for soil fertility and predecessors organic fertilizers are applied in terms of 20 to 30 tons per hectare of sown areas. In the forest-steppe zone 60 to 90 kg of nitrogen, 40 to 60 kg of phosphorus and 40 kg of potassium in an active substance per hectare are applied and in the steppe zone, 30 to 40, 40 to 60 and 40 kg, respectively.

In experiments conducted at the Scientific Research Institute of Agriculture of the South-East and the Saratov Agricultural Institute on dark chestnut soil of the Central Trans-Volga Area and southern chernozem the greatest harvest increases and improvement in the quality of durum wheat grain were obtained

with an application of 60 kg of nitrogen, phosphorus and potassium per hectare of sown areas. Under these conditions the wheat harvest increases by 2 to 5 quintals per hectare.

It is very important to sow durum wheat during the best agrotechnical periods by narrow-row and criss-cross methods and with first-category seeds prewarmed in the sun and treated with chemicals against diseases at the optimum seeding rate and with a simultaneous application of granulated superphosphate to rows. No more than 2.5 to 3 million germinated seeds per hectare must be sown. Usually, overstating of the seeding rate leads to their unjustified expenditure.

Durum wheat is heavily infested with weeds, which lowers the quality of grain. Therefore, the demands on its varietal and specific purity are much higher than on that of other crops. With due regard for this shorter periods of strain renovation (once in 3 years) have been set and they must be observed strictly.

The application of a proper agrotechnical complex ensuring high stable harvests of durum wheat should be supplemented with its prompt and qualitative harvesting. This is no less important a part of the work in the production and sale of high-grade durum wheat grain to the state. The violation of the technology of harvesting, selection and formation of batches of grain on threshing floors of kolkhozes and sovkhoses according to the indicators of the content and quality of gluten and the poor organization of its delivery to grain receiving enterprises often are the main reasons for the nonfulfillment of the plan for purchases of high-quality durum wheat grain.

It is especially important to prevent a gap between the mowing, selection and threshing of windrows. In conformity with weather conditions it is necessary to skillfully maneuver harvesting equipment and to use not only swath harvesting, but also direct combining in combination with the cleaning of grain on threshing floors in one flow and its subsequent delivery to grain receiving enterprises. All this will contribute to an increase in the purchases of high-quality durum wheat grain.

Such work is well organized and is carried out annually in Omsk Oblast in the form of a system of measures developed by the Siberian Scientific Research Institute of Agriculture and checked on the Sibiryak Sovkhoz in this oblast. A laboratory for an analysis of the quality of grain fitted with the necessary equipment operates on every farm during the preharvest period. The laboratory is placed on the central threshing floor in a room or a small railroad car.

The farms that do not have laboratories use the interfarm laboratory, or the laboratory of the closest grain receiving enterprise, to which farm laboratory workers are attached. A commission for the quality of wheat under the guidance of the chief agronomist is established by the order of the sovkhos director. An inspection brigade led by a seed breeding agronomist forms part of it. The brigade consists of two groups, that is, a group for taking and a group for analyzing samples, each having two laboratory workers. To eliminate errors and losses of the additional payment for quality, the inspection of the

grain of the new harvest is made three times: preliminary (with samples taken in the field or from the bales of individual fields on the threshing floor), basic and control inspections.

During a preliminary field inspection bundles from the inspected fields are taken in two diagonal lines 1 or 2 days before the harvesting and threshing of windrows and an analysis of every sample taken is made. During a preliminary inspection on the threshing floor two parallel samples are taken from each batch of grain and analyzed.

According to the results of a preliminary inspection grain batches corresponding to a certain level of additional payment for quality are formed. Bales are formed in the volume of the daily shipment of grain to a grain receiving enterprise. Two parallel samples are taken from each such batch and analyzed separately (basic inspection). The results obtained are reported to a grain receiving enterprise and grain is shipped in accordance with the schedule coordinated with it. The farm representative--executor (agronomist or laboratory worker)--goes to the laboratory of a grain receiving enterprise, where he checks the correctness of sod analyses.

If the farm is not sure of the laboratory data of a grain receiving enterprise, during the shipment of grain samples are taken from vehicles and the farm's average daily sample is formed. This sample is analyzed immediately (control inspection) and these data are submitted to the laboratory of a grain receiving enterprise for a check.

Taking the great value of durum wheat grain into consideration, the following increases in the price of soft wheat have been set: of the first category--100 percent (it was 65), of the second category, 70 percent (it was 40) and of the third category, 20 percent. The payment for the substandard grain of durum wheat is 10 percent higher than that of soft wheat in the oblasts, krays and republics, to which the plan for the purchases of this crop is assigned.

Existing conditions of durum wheat purchases more than cover farm expenditures on the production of the grain of this crop. Farms, when observing the proper agrotechnical complex, can obtain high stable harvests of high-quality grain and big monetary increases. More concern for the cultivation of durum wheat must be shown. On every kolkhoz and sovkhoz producing durum wheat crops it is necessary not only to grow a harvest, but also to sell high-quality grain meeting all standard requirements to the state.

The established incentive measures for managers, specialists, brigade leaders and other categories of workers directly ensuring the cultivation of high-quality grain of this crop must be strictly observed on farms producing durum wheat.

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## TILLING AND CROPPING TECHNOLOGY

### INCREASED PRODUCTION OF DURUM, STRONG WHEAT IN KAZAKH URGED

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 5 Sep 85 p 3

[Article by V. Kachurin, chief, Central Republic State Inspectorate for the Quality of Agricultural Products and Raw Materials, Kazakh SSR Ministry of Procurement: More Strong and Durum Wheats"]

[Text] In implementing the decisions of the 26th CPSU Congress and the April and July (1985) CPSU Central Committee Plena, workers in Kazakhstan's agro-industrial complex are giving great attention to producing high quality grain, first of all, strong, durum and high grade [tsennyy] wheats. Over 4 years of the current Five-Year Plan the share of such varieties in total wheat deliveries exceeded the levels in the 10th Five-Year Plan, reaching 83 percent.

The average annual procurements of high quality wheat reach 90-95 percent of the total in Kustanay, Tselinograd and Turgay oblasts; and for strong, up to 70 percent of total procurements of this crop. Last year farms in Tselinogradskiy Rayon (M. S. Ismagambetov is the chief state inspector for the purchase and quality of agricultural products) delivered 94 percent strong wheat and all the wheat delivered by the Krasnoyarskiy Sovkhoz (Chief Agronomist I. I. Maingart) and the Novoishimskiy (Chief Agronomist V. I. Shapar) was strong wheat.

Strong varieties accounted for 92 percent of the wheat delivered to the state by Atbasarskiy Rayon, Tselinogradskaya Oblast (Chief State Inspector S. M. Idrisov) while 98 percent of the wheat delivered by the Sovkhoz imeni Maxim Gorky (Chief Agronomist I. I. Anikeyev was strong.

Only strong wheat was delivered to the state by the Sovetskiy Sovkhoz (Chief Agronomist comrade Beshimov) in North Kazakhstan Oblast.

Farms in the republic received more than 700 million rubles during the current Five-Year Plan for deliveries of high grain. This includes 221.4 million rubles for farms in Kustanay Oblast and 149.2 million rubles for farms in Turgay Oblast.

This year there has been somewhat of a change in the payment procedure for the durum and strong wheat deliveries. A higher unit purchase price has been set for durum wheat -- 150 rubles per ton. The previously existing markups have been retained for durum wheat in class I (100 percent), class II -- 70 percent, and class III -- 20 percent. A 50 percent markup has been introduced on the purchase price for sales of durum wheat to the state over the level attained in the 10th Five-Year Plan, independently of whether or not the farm exceeds this level for all grain. Instead of the previous 25 percent markup over the price for soft wheat, there is a 10 percent markup for the most strong and high grade wheats containing at least 23 percent raw gluten and not lower than the second quality group.

In addition to regular units a calculated unit "raschetnaya natura" is being introduced for strong and durum wheat, if it meets GOST [State standard] requirements and if it has additional moisture (up to 23 percent more) than base condition wheat. In this case, the final result of the unit is increased by 5 grams per liter for spring wheat and 3 grams for winter wheat for each 1 percent moisture over the base norm. When the "calculated unit" has been used in the reception of Durum (class) and strong wheat which meets standard requirements the grain is paid for immediately at increased purchase prices. Unit based monetary markups over purchase prices for strong wheats are made on a "calculated unit" basis.

However, it must be kept in mind that a batch of grain with the "calculated unit" is formed on the basis of quality determined at farms. In view of this it is very important to make a preliminary evaluation of durum and strong wheat at kolkhoz and sovkhoz fields and threshing floors prior to the beginning of harvest.

There is a special discussion about durum (class) wheat. Even though they have plans for its delivery to the state, many farms do not even plant it. Year after year they fail to fulfill obligations for its production. There are especially many such farms in Kustanay, Pavlodar and Uralsk oblasts. Farms in EastKazakhstan Oblast have not even planted durum wheat for a number of years. The area devoted to it in Uralsk oblast has declined 3.5 fold. Poorly organized seed raising is one of the reasons for this.

Durum varieties produced at farms frequently do not meet standard requirements. Over 4 years of the Five-Year Plan only 14,000 tons of durum wheat were procured, 8 percent of the gross harvest. In 1983 the Krasnyy Mayak Kolkhoz (Chief Agronomist Sh. D. Doszhanov) in Burlinskiy Rayon, Uralsk Oblast, harvested 3,340 tons, but only sold the state 376 tons of classed durum.

The Lubenskiy Sovkhoz (Chief Agronomist B. Z. Baykatov) in this oblast harvested 870 tons of durum wheat in 1983 and 311 tons in 1984, but did not sell a single ton of classed wheat to the state. In 1984 the Aydarlinskiy Sovkhoz (Chief Agronomist N. F. Krasilnikov) in Turgay Oblast produced 1,338 tons of durum wheat, but sold the state only 48 tons of classed wheat. The main reason for this is partial mixing with soft wheat during harvest, transportation storage and processing on threshing floors.

Can this situation be corrected? Yes, if there is a prompt preliminary estimation of grain quality and no mixing with soft wheat is allowed.

Grain receiving enterprises have a special role in increasing the procurement of strong and durum wheat. They are obligated to receive and store grain according to technological charts providing for separate processing lines. At enterprise laboratories it is important to prevent mistakes in the determination of quality, and in the formation of average daily samples. There should be intensified control over location and the prevention of high quality grain losing its identification. State grain inspectorates should assure daily control and give methodological assistance in evaluating quality and the accuracy of accounts with farms.

At many farms grain is poorly cleaned. This violates state discipline. Therefore, not all the strong wheat sold to the state is actually strong. The implementation of recommendations following results of the preliminary evaluation of grain quality is especially important. Where there are no preliminary evaluations there are also no recommendations by specialists on how to clean grain so that it meets standard requirements. High quality grain on threshing floors frequently loses its identification.

Prompt preliminary evaluation and specific recommendations to farms covering each field evaluated and their implementation eliminate the mixing, and loss of identification of wheat and make it possible for all the high quality wheat delivered to the state to be strong, high grade or durum.

However, only one-fourth of all strong and durum varieties in the republic are given a preliminary evaluation for quality. It is necessary to preliminarily evaluate grain quality as it ripens in order to form batches of wheat similar in quality and to see that they are processed separately.

Taking actual crop conditions into consideration, kolkhoz and sovkhoz specialists determine the fields for this work and, together with grain receiving enterprise representatives, select samples during control threshing or from batches of grain stored at threshing floors and from the threshing of sheaves, taken from fields 2-3 days prior to harvesting, either directly, or prior to picking up windrows.

Selected samples (not less than one kilogram) for preliminary determination of grain quality are sent, accompanied by a grain receiving enterprise representative, to a farm laboratory, or to a grain receiving enterprise, accompanied by a kolkhoz or sovkhoz specialist. Analysis results are registered in a special journal, a card file compiled and two copies sent to the farm and grain receiving enterprise.

To facilitate and improve this work, a grain laboratory should be set up at the threshing floor of each farm, or, if it is better, a quality service made up of 3-4 specialists created. Some of them should be engaged in and be responsible for preliminary evaluations, observe the implementation of recommendations for cleaning grain and maintain ties with elevators and the rayon operational group for grain quality, while the others should observe combine operation, the efficiency of grain cleaning machinery at threshing

floors and fill out documents. In this case, preliminary evaluations can be very useful at threshing floors as well as fields.

Unfortunately, temporary laboratories have been by no means set up at all farms.

Grain receiving enterprises, partners in the agro-industrial complex, should give practical assistance to sovkhoz and kolkhoz laboratories by supplying instruments and equipment, and in training specialists. Oblast and rayon state inspectorates for the purchase and quality of agricultural products should organize work on preliminary evaluation.

The present harvest from virgin land fields is not bad. It is a matter of honor for all agro-industrial complex workers to give the state as much high quality grain as possible.

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## TILLING AND CROPPING TECHNOLOGY

### PROBLEMS WITH DURUM WHEAT IN VOLGA, URALS DISCUSSED

Moscow IZVESTIYA in Russian 7 Sep 85 p 2

[Article by V. Gavrichkin, A. Zinovyev and M. Ovcharov, special IZVESTIYA correspondents, Orenburg and Saratov oblasts and the Bashkir ASSR: "Durum Wheat"]

[Text] We heard the following in a trolley bus running in Saratov:

"I boiled macaronis and they stuck together," an elderly lady complained to her acquaintance.

"People say that now wheat is not what it used to be..."

This is how we became convinced once again that the topic chosen was urgent. It concerned durum wheat, without which good macaronis, vermicellis and biscuits could not be made...

At all times Saratov, Orenburg and Bashkir grain fields were famous for their highly valuable durum wheat grain. Now, however, such grain must be even transported from other places to the zone of its traditional cultivation. Why was fame lost? What is being done to restore it?

The harvesting campaign has three especially busy points: the grain field, the grain threshing floor and the elevator.

The grain field. During the hot noon we stood on the vast field of the Orenburg Zavety Lenina Kolkhoz. Combines operated. Quick-moving "Belarusi" with carts filled with chopped straw to the brim scurried to the fodder yard and back. The field became empty before our eyes.

"Here is our durum wheat. Pure gold!" V. Yeltyshev, chairman of the kolkhoz, held amber-colored grains in his palm. "We will obtain 23 to 25 quintals per hectare on an area of 815 hectares. We sowed Kharkovskaya-46 exclusively. This means that in no way will we deliver less than 14,000 quintals... Intensive technology came to our aid."

"And the quality of grain? Will it be high-grade wheat?"

"Certainly!" V. Yeltyshev said. "I promised the director of the Sorochinsk Grain Product Combine: I myself will bring samples for analysis and will personally see to it that not a single percent of gluten 'runs away.'"

The threshing floor. Later we visited the threshing floor on the neighboring Rodina Kolkhoz. Any farm can envy its equipment. However, as we were told, a vast area--2,000 square meters of asphalt--was piled with grain.

"With such a base," V. Zharkov, chairman of the kolkhoz trade-union committee, pointed to grain cleaning devices, accumulating hoppers, warehouses and sheds, "gross output' is not frightening to us. We work round-the-clock. Nor do we unload trucks of grain until we bring it up to the highest standards."

The elevator. The next day we found ourselves at the Sorochinsk Grain Product Combine. The way from kolkhozes and sovkhoses to this combine is not short--up to 120 km. We could not force our way to the laboratory! It turned out that agronomists arrived from Krasnogvardeyskiy, Sorochinskiy, Tashlinskiy and Aleksandrovskiy rayons. They followed the selection of samples for gluten in durum wheat with passion.

"It cannot be otherwise," V. Iryashev, agrochemical agronomist of the Komsomolets Kolkhoz in Krasnogvardeyskiy Rayon, said for all. "If you let the mistake of a laboratory worker slip by, you say good-bye to a high grade. It's no laughing matter, first-grade durum wheat now costs 300 rubles per ton!..."

Three snapshots of the 1985 harvest and three "sections" from its busiest points show that interest--first of all, economic interest--in the cultivation of durum wheat has increased sharply. However, this does not yet mean that matters will now move rapidly.

A plenum of the oblast party committee, where there was a sharp and principled discussion of the production and sale of grain, primarily strong and durum wheat, to the state, was held in Orenburg not long ago. The situation on the Saratov grain field is not better. As an example, we will cite the following, by no means joyous, coincidence. Like Orenburg Oblast, Saratov Oblast in 4 years owed 7 million tons of grain to the state. At the same time, the average yield of grain crops, as compared with the 10th Five-Year Plan, was lowered by 2.5 quintals. And exactly as in Orenburg Oblast Saratov farms fulfilled the plan for the sale of durum wheat grain only 7.6 percent. Their sown areas were reduced year after year.

The situation on Bashkir fields is even worse. In 7 years the procurement of high-grade durum wheat grain has dropped from 64,700 tons... to 200 tons. As yet not a single ton of first-grade grain has been procured.

There are many reasons why durum wheat has become an undesirable guest in the interfluvial area of the Volga, the Agidel and the Ural. As a result, there is a sharp--in 20 years three- to fourfold--reduction in crops. We would like to emphasize that this is a forced reduction. From the earliest times peasants

sowed durum wheat on a perennial grass sod and allocated abandoned and even virgin land, that is, strong and clean land, which rested well, for it. However, they plowed up virgin land and destroyed grass and clean fallow. In the stress on the production volume the wedge of grain crops was expanded in excess of the limits.

"Without fallow and other good predecessors, without crop rotation, the harvest of durum wheat dropped. Under such conditions barley, as well as oats, is more productive. Stress on the volume of grain production was put in the forefront. Durum wheat was almost brought to naught," N. Bolotin, chief agronomist of the Orenburg Sovkhoz imeni Boykov, told us. "It is good that we perceived this and undertook zonal farming systems... Last year we obtained and reproduced Kharkovskaya-46 super-quality stock seeds. This year we sowed 1,030 hectares. We cultivated 850 hectares according to intensive technology. In the spring of next year we will allocate 4,000 hectares for durum wheat."

We stood on the same "intensive" 850-hectare field, where plants received topdressing according to the norm and on schedule.

"Compare," N. Bolotin grinds in his palms at first an ear taken from an ordinary field and then, from an intensive field. "Ten grains more!... The difference in quality is noticeable to the naked eye. In the first grain is floury and here, amber!"

However, as it turned out, to grow amber is only half the problem. The troubles do not end here.

"Out of the 290,000 hectares, where durum wheat varieties were placed, on the eve of harvesting we first investigated the quality of grain on 125,000 hectares," Ya. Bebesko, chief of the Saratov Oblast Administration of Grain Products, says. "A card has been introduced for every field: The farm no longer has the right to deliver grain with indicators lower than those appearing in it."

Harvesting confirmed that the data of the preliminary "reconnaissance" proved to be correct. High-grade durum wheat grain flowed into elevators. Material incentives are also reflected here. For example, the Presidium of the Saratov Oblast Agroindustrial Association developed in advance a system and a procedure of material incentives for farm managers, chief agronomists, threshing floor workers and directors and heads of laboratories of elevators for the procurement of durum wheat grain.

"Imagine a situation: Grain is brought from a farm. In all its parameters it is high-grade, but it has a great deal of litter," Ya. Bebesko explains. "What should be done? Should it be poured into the general pile? No, the laboratory worker says. Bring it again to the threshing floor and clean it..."

Is it necessary to demonstrate how much depends in the organization of procurements on a laboratory worker? However, material incentives for the labor of laboratory workers have not been thought out.

The problem of material incentives is not so simple. Managers and specialists somehow receive incentives for the production and procurement of highly valuable grain. On the other hand, those that grow this grain often have got nothing for their pains. We recall a meeting in the field with D. Unru, manager of the cost accounting link from the Orenburg Zavety Lenina Kolkhoz.

"We worked for the sake of durum wheat--there are 200 hectares of it," the link leader said with pride. "We should obtain 25 quintals per hectare. We have direct interest in this."

"And in the quality of wheat?"

"You see," the link leader became flustered, "here it is possible to answer both 'yes' and 'no'..."

It became clear that increments for a high grade were applied to the link's earnings, but from the "general kolkhoz boiler." The existing procurement system does not capture the specific contribution of the link's collective, because there is a "lack of personal responsibility" for grain batches on the threshing floor and procurement officials give the kolkhoz a grade according to average daily samples.

"Of course, the payment should be according to the contribution of every collective. However, reliable instruments for a rapid analysis are needed both for procurement officials and for us," V. Yeltyshev, chairman of the kolkhoz, said.

The problem is not new. For many years we washed off gluten at elevators manually, hoping for a new precision instrument. Finally, it appeared--the so called MOK--mechanism for washing off gluten. However, the expectations connected with it proved to be futile. The process of analysis is slow (at times up to 1 hour-long) and labor intensive. Most importantly, the result is inaccurate, largely depending on the conscientious work of laboratory workers. During feverish activity, when there is a line at the gate, who will keep an eye on whether they have removed litter from the grain sample, whether they have dried, ground and sowed... Or let us take water. The instruction says that drinking water is used for washing off gluten.

"However, it is not the same," A. Chernyshev, secretary of the Orenburg Oblast Party Committee, told us. "We especially brought water from different regions and look," he showed us a table. The results of analysis for gluten washed off with different types of water vary significantly.

It is surprising, but a fact. The specialists of the Ministry of Procurement placed in service an apparatus known to be obsolete, although an electronic instrument executed at the modern level existed.



"I personally saw it in action," V. Sharapov, chief of the Saratov Oblast Agricultural Administration, says: "It is a dream! You pour a grain sample, press a button and literally in 1 and 1/2 minutes all the necessary indicators are on the panel and the punched card. To be sure, such an instrument is not advantageous for procurement officials. It will not enable them to understate indicators and to get rich at the expense of farms."

Yes, we were told about such cases. If wheat is a little below high-grade wheat, the kolkhoz will not receive a ruble of increments. However, it is sufficient for such grain to rest and to ripen during resting and procurement officials, not moving a finger, can convert it into high-grade grain. Its price is higher accordingly.

It is also good that it is not lost. At times, however, at elevators grain, which is only a tiny bit below high-grade grain, is mixed with ordinary grain. In the rush and, moreover, with the shortage of capacities this does not happen so rarely. Two years ago a brigade of IZVESTIYA raised the problem of the shortage of warehouses at Orenburg elevators. Unfortunately, everything remained without changes. For example, in order to place durum wheat, procurement officials are forced to unload barley from warehouses on open grounds.

"And if there is bad weather, what then?" we asked N. Serdyukov, director of the Sorochinsk Grain Product Combine.

"Then there will be a disaster," he answered. "We will not be able to place in storage batches of grain differing in quality separately and, moreover, to dry them."

Harvesting has not yet been completed. It is early to sum it up. However, here is the chief thing that a trip throughout fields in the Orenburg Area, the Volga Area and Bashkiria has shown. The attitude toward durum wheat is changing rapidly, very rapidly.

We will be frank: We should not expect a miracle. For example, the people of Orenburg Oblast intended to procure 400,000 tons of high-grade durum wheat and Bashkir farmers, 200,000. However, we will divide this quantity by the sown area and it will turn out that every Orenburg hectare should give 10 quintals of grain to bins and every Bashkir hectare, 25. We will add seeds and the inevitable percent of substandard grain to this and it will become clear that what has been envisaged cannot be attained even this year.

Only the first, at times timid, steps are taken in the organization of the production of durum wheats, although the striving is gratifying everywhere--to expand durum wheat areas significantly. However, even this is not simple. Good predecessors are needed and intensive technology must be introduced further. Excellent seeds and good varieties are greatly needed. However, what is sown here? The very old kharkovskaya-46. Saratovskaya-40 and Krasnokutka-6 are still sown in Saratov Oblast. The more productive Bezenchukskaya-139 is spread slowly. Obviously, the trip of Orenburgskaya-2 to fields has been delayed and Bashkirskaya-19 has not yet left the stage of state tests. Breeders have a big, if not to say, an unrepayable, debt.

There are many problems. No time is left for the solution of some of them, because they should have been solved yesterday. In order to revive the former fame of Saratov, Orenburg and Bashkir durum wheats, farmers, as well as all partners in the agroindustrial complex, must act vigorously and energetically, with a high sense of responsibility.

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## TILLING AND CROPPING TECHNOLOGY

### EXPERIMENTS IN INCREASES OF DURUM WHEAT YIELD DESCRIBED

Saratov STEPNIYE PROSTORY in Russian No 8, 1985 pp 27-29

[Article by V. I. Klimenko, head of the experimental base of the Timiryazev Agricultural Academy, candidate of agricultural sciences, and S. N. Makeyev, graduate student: "Durum and Strong Wheats in the Right-Bank Area"]

[Text] Saratov Oblast has sufficiently fertile soil, a dry climate, a negligible amount of precipitation during the grain forming period and an abundance of solar radiation. All this makes it possible to obtain high-quality grain of strong and durum spring wheat. Moreover, traditionally it was grown not only in the left-bank area, but also in the right-bank area of the oblast. However, during the last decade the quality of grain has deteriorated considerably. The content of protein and gluten in it has decreased and the production of high-quality grain of durum wheat is especially small. The sections sown with this valuable crop in the right-bank area are being reduced. Completely unsubstantiated proposals on the transfer of all durum wheat crops to the oblast's left-bank area are even made.

In the opinion of many researchers, the deterioration in the quality of grain, especially of durum spring wheat, is due to the violation of crop rotations, lack of good predecessors for spring wheat and failure to keep to sowing schedules. During early dry spring a delay in sowing periods leads to a big loss of soil moisture and, as a result, to a decrease in the harvest. During years with an increased moisture the vegetative period is prolonged and then the formation of high-quality grain is hampered. The difference in weather conditions throughout years requires the selection of correct sowing periods ensuring the maximum satisfaction of the requirements of wheat for the production of a high harvest of grain with good quality indicators. The shortage of available nitrogen in soil serves as one of the main reasons for a decrease in the protein content of grain under the conditions of this zone.

Biological nature makes it possible to accumulate the optimum quantity of protein in grain during the production of the highest harvests, but only if there is a sufficient content of available forms of nitrogen and other mineral food elements in soil and when the conditions for an active absorption and utilization are created.

Up to now the significance of predecessors, sowing periods and the provision of crops with nitrogen for the production of high harvests with a high-quality grain of soft strong and durum spring wheat under the conditions of the right-bank area of Saratov Oblast has not been studied sufficiently. This necessitated the setting up of experiments on this subject.

Work was carried out at the experimental base of the Mummovskoye Experimental Training Farm of the Timiryazev Agricultural Academy in 1981-1984 (right-bank area of Saratov Oblast).

Soil was leached loamy chernozem. The depth of the humus layer was 34 cm and the content of humus, 4.9 percent. Labile phosphorus according to Truog-Meyer amounted to 16.3 mg, exchange potassium according to Maslova, 27.4 mg and readily hydrolyzed nitrogen according to Tyurin, 5.7 mg per 100 grams of absolutely dry soil.

The minimum water capacity of soil in the meter layer was 315 mm and the permanent wilting moisture, 100 mm. Productive moisture accounted for 68 percent of the minimum water capacity of soil (215 mm).

In the experiment Saratovskaya 46 soft strong wheat and Bezenchukskaya 139 durum wheat were sown. Winter wheat (on fallow) and a 2- to 3-year old lucerne sod were used as predecessors. Three sowing periods were studied: the first period was early, as soon as soil ripened. During second and third periods sowing was carried out at an interval of 7 days.

The replication of variants was fourfold and the placement of plots, randomized. Their total area was 720 square meters and the calculation area, 600 square meters.

After the harvesting of predecessors fall plowing was carried out at the depth of 27 cm with simultaneous harrowing. On the sod following the aftergrowth of lucerne soil was additionally cultivated with a disk harrow. In spring after cover harrowing the  $N_{45}P_{45}K_{45}$  mineral fertilizer (nitrophoska) was applied. Presowing cultivation was carried out before the sowing of variants of first and second periods and another cultivation, before the sowing of the third period.

Depending on soil moistening throughout the years from 4.5 to 5.0 million germinated seeds per hectare were sown. Sowing was done with a 24-row seeder. During sowing 30 kg of granulated superphosphate per hectare were applied to rows.

During the years of the performance of experiments meteorological conditions were not the same and differed from average long-term conditions. The vegetative period of 1981 was characterized by dry weather, 1982 and 1983 were wet and 1984 was very dry.

Research results: Many agronomists and scientists believe that durum spring wheat is less productive than soft wheat. Such an opinion was formed in a situation when in the zone of durum wheat cultivation crop rotations were eliminated, the fallow area was reduced sharply and grain crops began to be

sown on grain crops continuously for many years. This led to a heavy weediness of fields and to a decrease in soil fertility. Under such conditions durum wheat, as more demanding on cultivation conditions, of course, was inferior in its yield to soft wheat. However, this does not at all mean that this is inherent in the biological properties of this wheat. Conversely, with the rise in the standard of farming and placement on good predecessors in crop rotation durum wheat under the same conditions produces grain harvests equal to or higher than those of soft wheat. The experience of advanced farms, as well as our research, points to this. On the average, in 4 years the yield of durum wheat, as compared with soft wheat, on the stubble predecessor increased by 0.6 quintals per hectare and on the sod, by 1.0 quintals per hectare. In absolute indicators the yield was expressed as follows: of durum wheat on the stubble predecessor, 19.8 quintals per hectare and on the sod, 21.9 quintals per hectare; of soft wheat, 19.2 and 20.9 quintals respectively. It should be noted that the sod is the best predecessor not only for durum spring wheat, but also for soft strong wheat. As compared with the stubble predecessor, in 4 years the yield of durum wheat on the sod (on the average, throughout sowing periods) increased by 2.1 quintals per hectare and of soft wheat, by 1.7 quintals per hectare.

Under the conditions of dry farming weather conditions of soil and air moistening are the determining factors in the productivity of spring wheat. It is evident that during dry years (1981 and 1984) the yield was lowered, that of durum wheat being lowered more. For example, during these years the productivity of soft wheat on the stubble predecessor (on the average, throughout sowing periods) was 13.8 percent higher than that of durum wheat and on the sod, 15.3 percent respectively. Conversely, during wet years (1982 and 1983) the yield of durum wheat on the stubble predecessor was 16.9 percent higher than that of soft wheat and on the sod, 20.9 percent.

The decrease in the yield of soft wheat, as compared with durum wheat, during a wet spring and summer period and, besides, during a dry period, but with intermittent, even small, rains moistening air and plants during the period of a mass spread of rust spores (more often during the phases of grain heading and formation) leads to the affection of soft wheat by this disease, which does not happen with durum wheat. This is the main reason lowering its yield. This is what happened in 1983 and 1984, which were wet years.

Sowing periods. The complex of conditions--temperature, soil and air moisture and light intensity--is formed differently throughout sowing periods and years. They affect not only seed germination, but also the further development of plants and their productivity. External conditions throughout sowing periods affect the wheat yield differently.

The sowing of soft and durum wheat on the stubble predecessor during the first period and after 7 days is poorly reflected in the yield and under the conditions of a protracted cold spring a tendency toward an increase in the yield on the stubble predecessor with sowing during the second period is observed. During the third period, on the 14th day after the beginning of sowing operations, on the average, in 4 years the yield of soft wheat was lowered by 1.2 quintals per hectare and of durum wheat, by 2.1.

It is well known that on the sod on more structural soil a balanced water condition is established earlier and soil is warmed better. Therefore, in contrast to the stubble predecessor, on the sod the highest harvests of wheat (on the average, in 4 years), both of soft wheat--22.7 quintals per hectare--and of durum wheat--23.0 quintals per hectare--were obtained during sowing in the first early period. Later periods led to a decrease both during wet and dry years.

It should be specified that in 1981, which was a dry year, there were unusual weather conditions for the formation of harvests throughout sowing periods. Under conditions of the protracted and cold spring the sowing of the first period began only on 2 May, 6 months later than usually. In addition, May was dry and cold. During the second 10-day period the temperature was only 2° C, which was 6.2° C lower than the norm. July was hot and dry. Good (55 mm) rain fell only in the middle of the second 10-day period. Under such weather conditions wheat crops of the first period were in the most disadvantageous situation. Owing to the cold weather during the sowing period and the subsequent drought, plants developed poorly and late precipitation could no longer improve their state and productivity.

Wheat crops of second and, especially, third periods were in a more advantageous situation. They better utilized June precipitation and formed higher grain harvests.

Grain quality. During the vegetative period the weather determines the quality of wheat grain to a greater extent. A higher percent of crude gluten and protein, that is, 36.8-34.9 percent in soft wheat and 35.4-32.9 percent in durum wheat, was accumulated in grain in the forming and filling period during the dry years of 1981 and 1984 with hot and dry weather. During wet years the content of crude gluten (and protein) in grain was much lower than during dry years, comprising 27.1-29.7 percent in soft wheat and 23.1-27.2 percent in durum wheat; that is, in the former there was a reduction of 9.7-6.3 percent and in the latter, of 12.3-5.7 percent.

The sod proved to be a better predecessor. There 32.1 percent of crude gluten and 15.9 percent of protein were accumulated in soft wheat and 28.7 and 16.6 percent respectively, in durum wheat. On the stubble predecessor these indicators were lower, comprising 28.9, 13.8 and 26.9, 15.0 percent respectively. A significant difference in the content of gluten and protein in grain depending on sowing periods was not established. However, all these indicators were higher during the second sowing period.

Better conditions of nitrogen nutrition, especially during later phases of plant development (heading-beginning of filling), contribute to a high concentration of protein in grain. Such conditions were created after the plowing of leguminous perennial grass crops. On the sod in the arable soil layer, on the average, in 4 years the content of nitrate nitrogen both before sowing (4.87-4.73) and during the heading phase (2.83-2.79 mg per 100 grams of dry soil) was higher than on the stubble predecessor: before sowing 4.10-4.13 and during the heading phase 1.74-1.42 mg per 100 grams of dry soil. As a result, soft and durum wheat grain with a higher content of gluten and protein was obtained on the sod.

It should be noted that, as a result of the higher hydration capacity, the content of crude gluten in the grain of soft wheat was higher than in the grain of durum wheat (in similar comparable variants). Conversely, the content of protein in the grain of durum wheat was higher than in the grain of soft wheat. As a result, the harvest of durum wheat was higher. Whereas in soft wheat (on the average, in 4 years) the harvest of protein was 2.65 quintals per hectare on the stubble predecessor and 3.30, on the sod, in durum wheat this indicator increased to 2.96 quintals per hectare on the stubble predecessor and to 3.59, on the sod.

The ratio of crude gluten to protein depends on many conditions, primarily on weather conditions, the predecessor and the type (variety) of wheat and fluctuates over a wide range: In soft wheat on the stubble predecessor from 2.48 in a dry year to 1.80 in a wet year; on the average, in 4 years, 2.09. This ratio was observed on the sod--from 2.30 in a dry year to 1.74 in a wet year and, on the average, in 4 years totaled 2.0. In durum wheat the correlation between crude gluten and protein is lower than in soft wheat: on the stubble predecessor from 2.0 in a dry year to 1.55 in a wet year and, on the average, in 4 years, 1.79. On the sod 1.90, 1.60 and 1.72 respectively. The reason for these fluctuations lies in the fact that the gluten of wheats growing under different weather conditions of the year and on soil differing in fertility has a different capacity for the absorption of water during washing off. Data on the hydration of crude gluten also attest to this.

The economic efficiency of cultivation of soft and durum wheat was determined basically by three factors: expenditures on the cultivation, yield and quality of grain. Direct expenditures on grain production were calculated according to technological charts with due regard for the actual expenditures on the production areas of the Mummovskoye Training Farm. During the years of the performance of experiments expenditures per hectare of cultivation of soft and durum wheat were almost the same and, on the average, totaled 136.26 rubles throughout the years. Purchase prices of high-quality grain were determined by the decree No 640 dated 23 December 1982 of the Council of Ministers and were expressed by purchase price increments (10.20 rubles per quintal) for the grain of soft wheat; for soft-strong wheat, when the content of gluten of the first group in grain was 32 percent and more, of 50 percent and when it was 28 to 31, of 30 percent. When the content of gluten of the second group was no less than 25 percent, of 10 percent; for first-grade durum wheat (no less than 28 percent of gluten), of 100 percent; for second-grade durum wheat (no less than 25 percent of gluten), of 70 percent; for third-grade durum wheat (no less than 25 percent of gluten), of 20 percent; for substandard grain, of 10 percent. Knowing the expenditures on the cultivation of wheat, its yield per hectare and purchase prices of grain with due regard for quality, we calculated the production costs of grain and the standard net profit per hectare. With the same expenditures on cultivation and close indicators in the yield of soft and durum wheat the production costs per quintal of grain of these crops were also close and, on the average, in 4 years amounted to the following: of soft wheat on the stubble predecessor, 7.25 rubles and on the sod, 6.71 rubles; of durum wheat, 7.48 and 6.90 rubles respectively. Higher purchase prices of high-quality durum wheat grain also determined the derivation of a higher, as compared with soft wheat, standard

net profit. Whereas from soft wheat, on the average, in 4 years the standard net profit on the stubble predecessor was 90.73 rubles and on the sod, 151.64 rubles per hectare, from durum wheat this indicator rose to 162.39 rubles on the stubble predecessor and to 260.03 rubles per hectare on the sod.

Thus, under the conditions of a high standard of farming, preservation of soil fertility and placement in crop rotation on appropriate predecessors durum spring wheat in its yield is not inferior to soft wheat. During wet years, when soft wheat is severely affected by rust, durum wheat gives higher harvests. The sod is the best predecessor not only for durum wheat, but also for soft spring wheat.

Depending on the type of spring, sowing periods affected the yield of wheat differently. During dry and warm spring early periods had advantages. Under the conditions of protracted and cold spring sowing during an early period and 7 days after the beginning of sowing affected the yield poorly. In soft wheat there was a tendency toward a rise in this indicator. Therefore, durum wheat should be sown first. Sowing carried out after 14 days (following the beginning of sowing operations) lowered the yield, regardless of the nature of spring, in an especially sharp manner during dry spring.

Weather determined the quality of grain in many respects. During dry years, especially with a hot and dry period during grain formation and filling (1981 and 1984), the content of crude gluten in grain increased considerably, by 6 to 10 percent, as compared with wet years (1982 and 1983). On the best predecessors, especially on the sod, where the conditions of nitrogen nutrition were favorable, grain with a content of protein higher than in soft wheat was obtained. However, owing to a greater hydration, the content of crude gluten was higher in the grain of soft wheat. With the same expenditures on the cultivation and close yield of soft and durum wheat, but with a higher purchase price of the high-quality grain of durum wheat, this also determined the derivation of a higher profit from the cultivation of durum wheat, especially on the sod.

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## TILLING AND CROPPING TECHNOLOGY

### WHEAT QUALITY PRICE DIFFERENTIATION URGED

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 10 Oct 85 p 2

[Ye. Sembin, department chief, Kazakh Scientific Research for Agricultural Economics and Organization, candidate of economic sciences: "Wheat Quality Requires more Differentiated Prices"]

[Text] With regard to the quality of grain and the strength of its flour, the wheat grown in the soil and climate of Kazakhstan, in spite of its fairly low yields, has no equals in our country or abroad. Protein and gluten content is twice that of foreign basic indicators for these qualities.

The high quality of strong and high grade grain is stimulated by markups on the purchase price for soft wheat. During the 10th and 11th Five-Year Plans, as a result of incentive payments, farms in the republic obtained an additional 1,85 rubles for each hectare in wheat. Thanks to this wheat profitability increased to 27.2 percent. Average annual additional payments for high quality grain throughout the republic amounted to 22.9 percent of purchase prices.

However, they are subject to considerable regional variations. In the main grain growing regions they range from 7.5 to 31.6 percent.

Grain quality improvements depend upon farming standards. For example, during the past Five-Year Plan farms in Ruzayevskiy Rayon, Kokchetav Oblast obtained 2.27 rubles in additional payments per quintal of wheat for high gluten content. In other words, annual additional sales receipts averaged 3.1 million rubles, raising profitability to 26.9 percent. Nearby rayons, having much better soil and climate produce less high grade grain. Arykbalyskiy Rayon received only 0.48 rubles additional payments per quintal and Chistopolskiy Rayon only 1.64 rubles.

According to data from the Kazakh SSR Ministry of Procurement, during the 10th and 11th Five-Year Plans wheat protein and gluten content did not change, while yields even declined by a third. Farms in Uralsk, Aktyubinsk and Semipalatinsk oblasts are receiving smaller markups for grain quality. In Alma-Ata, Taldy-Kurgan and Chimkent oblasts all strong wheat was sold as ordinary [ryadovaya], although every year regionalized varietal seeds are planted.

Improvements in grain quality are equivalent to additional output with the same labor and material outlays. However, this requires further perfections in the system of economic incentives, in standards and the procedure for determining grain quality. For example, the existing GOST for durum wheat provides for 10 parameters. Similar requirements are made upon strong varieties. All grain quality traits are given equal rank. If any of them do not correspond to established grain parameters, the grain is included in a lower class or not classified at all. In reality, these traits are far from equal. Moreover, many of them are determined by organoleptic methods, creating conditions for subjective evaluations. At Ministry of Procurement enterprises this grain can be brought up to standard condition, for example, with regard to moisture content. The quantity and quality of gluten in it does not deteriorate.

GOST requirements upon gluten quality and quantity -- the main trait of grain strength -- are well founded. However, it is during content determination that errors are most probable. Procurement workers' overcautiousness increases the degree of errors. Even a miserly gluten content can serve as the basis for putting higher class grain in a lower class. This range is narrowed in the economic interest of kolkhozes and sovkhoses. Production outlays for durum wheat with 25-27.9 percent gluten content are far from equivalent. Farms do not receive additional payments for the first group's gluten quality. In the third group grain quality is unclassified. This is not a proper approach to the formation of prices for a main trait of durum wheat quality. Under the existing price formation system, a minimal amount of durum wheat is sold at the highest markup. During 1981-1984 in the republic only 9.7 percent of it was sold at a 100 percent markup.

The main shortcoming in the existing GOST for durum and strong wheat is the equivalent approach to quality determination. Differences of one-tenth of a percent in moisture, weed infestation and gluten content create a huge difference in purchase prices. If a batch of 27.9 percent gluten durum wheat and the other traits are first class, the purchase price for 1 ton is 255 rubles, while a ton of base condition wheat sells for 150 rubles. However, if gluten content is 28 percent, the purchase price rises to 300 rubles per ton. If the other traits are second class and gluten content is 24.9 percent, the purchase price is only 180 rubles. However, if gluten content is 25 percent, the price rises to 255 rubles.

As one can see, one-tenth of a percent change in a parameter can considerably reduce purchase price. In our view, this approach has no economic logic. It gives priority to procurement workers and damages kolkhoz and sovkhos economies.

The price formation system which has evolved hinders increases in the production of high quality food grains. It is therefore necessary to establish more objective criteria for evaluating durum and strong wheat quality. It is necessary to more thoroughly differentiate purchase prices for their protein and gluten content, the main quality components.

Prices now in effect mainly stimulate growth in output sales volume. Farms growing grain with gluten content higher than present standards do not receive a higher price. For example, this year farms in Kzyltyskiy Rayon, Kokchetav Oblast delivered about 13,400 tons of durum wheat, 75 percent of which had gluten content in the 29-36 percent range. However, they received the same markup as for 28 percent gluten grain. It would therefore be advisable to set a progressively rising price for each percent gluten content in the varieties involved. Through this alone farms in Kazakhstan could have sold durum wheat at a 11.2 percent higher price and soft wheat at a 13.7 percent higher price. Purchase prices for durum and strong wheat varieties should be differentiated through markups over the base price for each 0.1 percent rise in gluten content.

In order to stimulate increases in the production of durum wheat, which requires larger production outlays than does soft wheat, it is, in our view, necessary to raise its base purchase price 50 percent higher than that of soft wheat and to henceforth maintain this price ratio. It would be advisable to have a 50 percent markup on the purchase prices of strong varieties for farms which exceeded last Five-Year Plan's high quality wheat sales volumes.

Kazakhstan's strong and durum wheats have much higher use value than do grains produced in other regions in the country. Therefore, their purchase prices should be higher. This will stimulate the production of high quality grain.

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## TILLING AND CROPPING TECHNOLOGY

### RESEARCH COOPERATION RESULTS IN NEW BUCKWHEAT VARIETIES

Moscow SOVETSKAYA ROSSIYA 16 Apr 85 p 2

[Article by N. Shakhov, Selection Department Chief, Kursk State Agricultural Experiment Station": "Buckwheat: Varieties and Yields"]

[Text] Buckwheat has an honorable place among food crops. Its highly nourishing groats and flour, the healthy substances in it, and its excellent nectar-containing blossoms make buckwheat irreplaceable in many respects.

Unfortunately, in recent years there have been unjustifiable reductions in the area planted to this crop. In order to correct this situation, a CPSU Central Committee and USSR Council of Ministers' decree made provisions for improvements in all aspects of groat crop production. It also pointed out the need to breed intensive type varieties. Comparatively new varieties, "Aelita", "Kalininskaya-7", "Kievskaya", "Chernopolnaya", "Bolshevik-4" and others are grown on kolkhoz and sovkhoz fields. However, they do not meet the requirements of intensive crop production. Their main shortcomings are unstable yields and high sensitivity to unfavorable climatic conditions.

In contrast to other crops, for a long time buckwheat selection was conducted at a low methodological level and insufficient volumes. A substantial flaw in selection work organization is the dispersion of specialists. Comparatively large numbers of specialists are working at the All-Union Scientific Research Institute for Seed Legume and Groat Crops, the Ukrainian Scientific Research Institute for Crop Production and the Kamenets-Podolskiy Agricultural Institute. At the remaining institutions only one or two individuals are working on buckwheat selection, and they often have other tasks. Their work cannot be very productive.

Under such conditions, the dissemination of experience in cooperative efforts on selection deserves thorough attention. Since 1976 the All-Union Scientific Research Institute for Seed Legume and Groat Crops and the Kursk, Orel and Sumskiy Experiment Stations have been working, based on legal contracts of collaboration, on the development of new buckwheat varieties for a broad region, including the Non-chernozem Zone, the Central-Chernozem belt and the Ukrainian forest-steppe. This program is led by N. V. Fesenko, doctor of agricultural sciences and chief of the Buckwheat Selection Laboratory at the All-Union Scientific Research Institute for Seed Legume and Groat Crops. This collective labor permitted more complete use of selectors' creative potential

and increases in their responsibility. We quickly started obtaining practical results and making theoretical conclusions.

At the All Union Scientific Institute for Seed Legume and Groat Crops and the Orel Agricultural Experiment Station new selection methods have been developed, old ones improved and valuable selection material created. "Bogatyry", Shatilovskaya-4", and "Shatilovskaya-5", varieties of these institutions, now occupy more than one half of the area devoted to buckwheat in our country. "Skorospelaya-81" planted as a fallow crop, is well known. The "Orlovchanka" is being introduced into production.

The program for joint work by the four institutions covers all stages in selection, from choosing the initial material to competition and ecological variety testing. At a minimum, we meet twice a year to discuss research plans and results. It is especially useful to examine crops, and visually compare the same material under different conditions. The all-union evaluation at various points makes it possible, at the selection process stage, prior to state testing, to find the selection number distinguished by high yield and plasticity and to find samples which have only shown their advantages at individual points.

The recent practical results of this cooperation are this year's regionalization of four jointly selected varieties. The "Aromat" has been planted in Altay Kray and Ulyanov and Donetsk Oblast. Selection for limited branching led to the creation of the "Ballada" and "Sumchanka" varieties, which have gained the right to be planted on fields in Orel, Nikolayev, Sumy, Kustanay and Pavlodar oblasts. The "Nektarnitsa" variety, created by periodic selection for combined capabilities, has been proposed for Novosibirsk Oblast. This same method has been used for the "Orlitsa", undergoing state testing. The organizing institutions have sent the first batches of higher reproduction seeds in order to expand seed raising in areas of regionalization.

Collaboration is by no means limited to the independent creations of selectors. At the Kursk Station, for example, much effort is expended on work with hereditary factors of buckwheat distinguished by variegated blossoms, fruit formation and ripening, resistance to lodging and other valuable traits and properties. Homostylic, nonblossoming, short-stalked, green flowered and other new forms are being brought into the selection process.

Our station is distinguished by exceptionally favorable soil and climatic conditions. Therefore, as a rule our buckwheat crops are in good condition and yields in selection nurseries are high. In the 1980 variety testing competition the record yield was 45.3 quintals per hectare. All this creates the conditions for the expansion and deepening of selection work. The USSR State Committee for Science and Technology has allocated additional resources for this.

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## TILLING AND CROPPING TECHNOLOGY

### BELORUSSIAN BUCKWHEAT CROPPING PRACTICES DESCRIBED

Minsk SELSKAYA GAZETA in Russian 24 May 85 p 2

[Article by A. Anokhin, senior scientific associate, BelNIIZ [Belorussian Scientific Research Institute for Crop Production, and V. Kuratnik, senior agronomist, Grain Crops Department, Belorussian SSR Ministry of Agriculture: "Buckwheat, a Profitable Crop"]

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[Text] Progressive farms' work experience shows that if the technology for raising buckwheat is observed, one can expect steadily high yields from this crop year after year. The Iskra Kolkhoz in Chervenskiy Rayon, the Zavety Lenina and Pobeda Kolkhozes in Maloritskiy, the Imeni Karbyshev in Mostovskiy and the Krinichnaya Goskhoz in Mozyrskiy Rayon might serve as examples of this. Every year they obtain 10-16 and more quintals of buckwheat per hectare.

The optimal times for planting buckwheat have already arrived this year. Planting is in full swing at a number of farms. In view of the better soil moisture and high temperatures, this should be completed everywhere by 1 July.

The creation of all conditions for buckwheat's growth and development is an indispensable condition for obtaining high yields.

This requires:

When planting crops taking into consideration soil type, its fertility, mechanical composition, relief, weed infestation, presence of apiaries and natural pollinators. The soil should be light, well aerated and sufficiently supplied with moisture and nutrients;

The careful leveling of the soil. Light cultivators --RVK's [ripper rollers] --are used to till tightly bound soils to a depth of 6-8 centimeters.

The timely and high quality application of mineral fertilizers. Nitrogen fertilizers (ammonium nitrate and urea) are applied during preplanting tillage at doses of 45-70 kilograms per hectare.

It is not recommended to apply ammonia liquor or anhydrous ammonia to buckwheat. In addition to other undesirable factors, these fertilizers scare away bees, causing yields to decline.

The liming of soddy-podzolic soils sharply increases buckwheat's requirements for boron. Therefore, the application of borate superphosphate or boric acid is one of the most important ways of increasing yields. Fifty kilograms of borate superphosphate per hectare should be applied during planting. If no borate superphosphate is available, it can be replaced by boric acid (6-9 kg in 200 liters of water per hectare). This boric acid solution is applied by boom sprayers during any spring tillage operation.

The depth of seed placement in cohesive soils is: for the "Yubileynaya-2" and "Chernoplodnaya" varieties -- 3-4 cm; in light soils -- 4-6 cm; while for the "Iskra" and "Minchanka" the figures are 4-6 and 5-7 cm. In order to reduce weed infestation and eliminate soil crusts, 3-5 days prior to the appearance of sprouts, the soil is harrowed. This must not be done during sprouting.

In addition to agrotechnical measures, chemical measures should also be taken in the struggle against weeds. On the day after planting, a solution of ammonia salts and 2,4-D (1.2 kilograms active ingredients dissolved in 200 liters of water) is applied to each hectare. This solution must be applied only by a boom sprayer, the solution carefully mixed and equipment span carefully observed, not allowing overlapping and double spraying.

During the vegetative growth period, widely spaced plantings are cultivated at least twice. The first cultivation takes place during the full sprouting phase or during the appearance of the first true leaf. The soil is first tilled 5-6 cm deep using L-shaped inter-row shovels, while the second tillage, during budding, is to a depth of 10-12 cm, using duckfoot or blade shovels. Two-three days prior to blossoming apiaries are put out as close as possible to buckwheat fields.

If the cropping technology is observed, the planting of at least two varieties, regionalized for different ripening time and response to climatic conditions, guarantees high buckwheat yields.

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## TILLING AND CROPPING TECHNOLOGY

### MORE BUCKWHEAT GROWING IN SIBERIA, FAR EAST URGED

Omsk ZEMLYA SIBIRSKAYA, DALNEVOSTOCHNAYA in Russian No 7 Jul 85 pp 15-18

[Article by V.V. Radul: "Who Will Help Buckwheat?"]

[Text] The journal's editorial mail sees a lot of complaints about the unjustified decrease in production of valuable groats crop. This subject was suggested to us by a disturbing letter which the editorial office received from Nikolay Vasilyevich Krasilnikov, an inhabitant of Kemerovo Oblast.

"I would like to ask the editorial office," he wrote, "to answer why it is that buckwheat has ceased to be sown or is sown in a very small amount. This product is simply not to be found in the grocery stores. Many children do not even know that there is such a thing as buckwheat porridge. It is painful even that such a valuable product is disappearing from Siberians' diet."

Truly, despite the fact that many anxious opinions have been expressed recently in defense of the primordial Russian crop--buckwheat--a black cloud has been hanging over the white buckwheat field for many years now. And it has to be plainly remarked straightaway that if there is no change in the attitude toward this valuable groats crop, there will be no fine weather for a long time to come.

Of course, such a pessimistic forecast will hardly suit any Siberian, any Far Easterner (who for all the known reasons are particularly in need of high-calorie food). Nonetheless, it is as yet difficult to draw any other conclusion.

The oddest aspect of the situation is the fact that, despite the big changes affecting the "status" of buckwheat, economic planners' attitude toward its production is changing extremely slowly.

To what do these changes amount? Primarily there has been an increase in material interest--the state pays R400 per ton of buckwheat. As is known, even cereals do not have such high purchase prices, and in this respect it is beyond competition. Further, procurement officers put it on a barter basis as a ton of formula food for livestock, and at any time, what is more. The biggest harvests are soundly encouraged by payment in kind. In a word, the state is adopting significant measures to awaken the farmer's interest in the production of this valuable crop. There is benefit wherever one looks both to the state and the kolkhoz and sovkhoz. Without any doubt, buckwheat may be and needs to be taken up, but only in earnest.



I was given the following information in the RSFSR Ministry of Agriculture: last year fulfillment of the plan for the production of buckwheat on all categories of farm in the West Siberia area constituted 75 percent, the East Siberia area 56 percent and the Far East 52 percent. And if we take Amur, Irkutsk and Chita oblasts, plan fulfillment here does not exceed 40 percent. Nor was the situation any better in these oblasts in preceding years either. What is the matter? Such results given such big state guarantees.... The reasons most likely need to be sought in the most important thing--the responsibility of each leader and specialist of the agrarian-industrial complex for the fate of the given crop and the fulfillment of plan discipline.

The situation demands that decisive measures be adopted. Even, furthermore, on the farms of the oblasts which compared with others appear more or less successful in terms of this crop. Last year Omsk Oblast, for example, produced 3,500 tons of buckwheat, which constituted 88 percent of the plan--this was the best indicator in Siberia and the Far East. Nonetheless, one would not call this oblast a leader. Yet it would seem that it would be of considerable importance to this same West Siberia area to have at least one such leading oblast. It would be possible here to concentrate progressive experience, perfect production techniques, test strains.... In a word, to solve a number of the Siberian buckwheat sowers' difficult problems.

I have met many specialists of the region's kolkhozes and sovkhoses and spoken candidly with them about buckwheat. Some people believe that the main reason for the disruptions in the supplies thereof is that the local leadership is not authorizing an expansion of the area sown to this valuable crop. Generally, it is understandable, many agronomists observe, there have been several unsuccessful years for grain, the forage situation is strained.... All this is so. But, after all, buckwheat is irreplaceable in the daily diet. And people rightly demand it both in the village and in the city.

Let us now investigate whether buckwheat really infringes on the interests of grain production.

Let us take as an example the West Siberia area, where compared with two areas taken together--East Siberia and the Far East--the areas sown to buckwheat are 1.5 times greater. This crop occupied 119,000 hectares here in 1981, 146,000 in 1982, 174,000 in 1983 and 163,000 hectares in 1984. Thus the statistics indicate a certain growth even.

It is again most likely a question of something else--the mentality of the farm leader and specialist. Sturdy work has to be done to obtain 15-16 quintals per hectare. Bees are needed to pollinate it, and since it is a question of live beings, consequently, fields without the application of toxic chemicals and much else are essential. It is altogether simpler not to bother with this crop. It is not as difficult gathering the same harvest of cereal crops, given a more or less favorable weather situation. For this reason there are still many farms moving this slowly to expand the areas sown to buckwheat.

Any agronomist knows that it is good to allocate one-tenth of the grain field to buckwheat for the sake of "phytotherapy". If it is sown at the start of

summer, it is possible also in this additional warm time to stimulate wild oats very well and offer them up to the sharp disks of the cultivator.

But the essence of the matter consists not only of an expansion of the sown areas. Intensification, which is becoming a firm part of agricultural production, presupposes, finally, not hectares but increased yield. How do matters stand with this important indicator?

Siberian veterans of peasant labor A.B. Vasilenko and S.K. Kulagin from Novosibirsk Oblast told me a great deal about past harvests and the present poor harvests of the "northern rice". Their arguments generally amounted to what has already been heard repeatedly--in years when the yield of the main crops was low, a more tolerant attitude was adopted toward buckwheat. When, on the other hand, the potential of cereal crops increased sharply, many farms essentially ceased having anything to do with it.

Hardly anyone would attempt to argue with them, particularly in Chita, Amur and certain other oblasts, whence the following facts were communicated to us. The farms of Kyrinskiy, Akshinskiy, Nerchinsko-Zavodskiy and certain other rayons of Chita Oblast, for example, obtained 0.6-1.7 quintals of buckwheat per hectare. The oblast has the necessary material resources and experienced personnel, that is, everything necessary to ensure that this crop not only be reliably registered in Chita soil but also to secure guaranteed yields and gross harvests thereof. But instead of improving agrotechnics, selecting zoned varieties and consistently undertaking concentration of the sown areas, some leaders are trying to rid themselves of this goat crop altogether. Is this not the reason why procurements thereof here constitute only 23-25 of the plan?

Attempts are seemingly being made to increase the areas sown to this crop on certain farms of Amur Oblast, but the yield has dropped by half. The kolkhozes imeni Ilich and imeni Sverdlov of Romnenskiy Rayon are harvesting less than 5 quintals per hectare, although they were quite recently gathering 10-14 quintals. And there is, I daresay, just one reason--lax management: sometimes the soil has not been prepared in time, sometimes the seeds have been substandard or fertilizer has not been allocated for the buckwheat.... What is disturbing is that no one is held responsible for these blunders. And where there is no stringency, it is pointless talking about a proprietorial attitude toward the land.

All these facts, of course, characterize not only the attitude of certain managers toward the valuable crop but also toward what ultimately values their labor--the land. If you do not invest in it what you should, it will never respond.

There is a shortfall of approximately 1,400 quintals of buckwheat grain annually in Omsk Oblast's Odesskiy Rayon owing to a shortage of bees. In order to make good this shortfall some farms have found a simple way out--they have increased the area sown to buckwheat by 130-160 hectares. But who will concern himself with the efficiency of the work of the hectare and its yield?

This question may be addressed to the Kemerovo people also, who, as N.V. Krasilnikov wrote us in his letter, "have long since forgotten the taste of buckwheat porridge." Only 3.2 quintals of buckwheat were obtained here last year from each of 1,900 hectares. The Kemerovskiy Oblispolkom Agriculture Administration explained the reasons for this yield by the fact that the oblast is not notified of a plan for this crop and that it is sown mainly as a nectariferous plant. Thus: there is no plan, therefore there is no buckwheat, and the fact that such an appropriate tract of land is used any old how troubles no one. And this in an industrial oblast, where each hectare of fertile land is, as they say, worth its weight in gold!

In order that our readers may have a fuller idea of the reasons behind the shortage of buckwheat I will also reveal a "secret" from the arsenal of certain management tricks. Following the buckwheat harvest, the entire mass of the grain on the farms is considered the gross harvest. It is from this that the yield is deduced. But up to 40 percent and sometimes more of this mass is so-called "hardpan"--unripe grain (the degree of its unripeness owing to late flowering at different growths of the plant is dissimilar), which is used only as livestock feed. And the result is that the gross amount seemingly corresponds to the plan, but little grain comes into commodity circulation. Thus seemingly innocent economic resourcefulness frequently results in a shortage of the valuable product.

Some specialists allude to the fact that buckwheat is a capricious crop and given to "infarction" (!) even. Truly, it makes stringent demands on cultivation conditions: it is afraid of light frosts and high temperatures, and it needs both special soil and techniques. But do other crops demand less attention, particularly now, when intensive techniques are being assimilated?

We should very likely refer less to these difficulties and look more and attentively at the agrotechnics which are still being applied on many farms of the region because it is precisely the failure to comply with the agrotechnical methods of the cultivation of this crop which is the main reason for the low harvests.

Scientific establishments and the practice of the leading farms, for example, have proven the advantage of wide-row sowings (and there are very few of them in the region!) over conventional rows. Given an area sown by the wide-row method with two-fourfold inter-row hoeing, the buckwheat yield increases by 4-5 quintals per hectare. Or to take another example. It is well known that buckwheat is sensitive to soil compaction. Thus given an increase therein from 1 to 1.3 cubic gram-centimeters, the buckwheat yield declines 40 percent. In a word, there is considerable potential for an increase in the yield of this crop.

The experience of the leading Siberian farms testifies that full use is not yet being made of its cultivation potential. Interesting experience of the cultivation of this valuable crop has been accumulated in Altay Kray's Sovetskiy Rayon. The leaders and specialists of this rayon moved boldly toward an increase in the areas sown to groats, which occupy almost 24 percent in the structure thereof. Currently, given an average buckwheat yield of 11.6

quintals per hectare, individual farms are obtaining 23-25 quintals. Is this not an example attesting the big possibilities of this crop!

What is the essence of the Altay farmers' experience? They have gambled primarily on the introduction of complex and progressive operating methods of cultivation. Whereas previously buckwheat was accommodated in the last field of the crop rotation, it is now arranged per winter crops, rotation of the perennial grass furrow and row crops. The agronomists have given sound thought to the methods of the spring cultivation of the soil, the purpose of which is the maximum preservation of moisture and the extermination of weeds. They have established the optimum sowing times. It is believed there that buckwheat should be sown in the foothills zone in three stages with an interval of 5-7 days and that this lengthens the flowering period and contributes to the better work of the bees and, consequently, pollination.

The rayon engineering service also has ascertained a number of singularities in the cultivation of this crop. It is advisable to thresh buckwheat with the "Niva" SK-5 combine, for example, and not the "Sibiryak" SKD-5 since single-drum combines crush the grain less. The use of apron-plank pickup attachments reduces losses considerably.

Many specialists believe that buckwheat sowings should be expanded even more in the foothills zone of the Altay. Sowings thereof under the conditions of this zone are capable of providing considerably more grain per hectare if there is an improvement in this crop's cultivation techniques, which at present are practically indistinguishable from the techniques of cereal crops. It is advisable to introduce wide-row sowing, which supports the fight against weeds by way of inter-row tilling.

The additional outlays will undoubtedly be recouped. Whoever has treated this crop seriously has long had no doubts on this score. The following figures were adduced 2 years ago in an article by G.P. Babanov, chief economist of the Altay Kray's "Altayskiy" Sovkhoz, "Buckwheat Is a Profitable Crop," which was published in our journal: the sale price of a quintal of buckwheat had increased from R41 in 1976-1980 to R64.2 in 1982. Each hectare produced in 1982 takings of R705.1, which was the equivalent of the sale therefrom of 45 quintals of cereals. Furthermore, 21 kilos of honey were obtained per hectare of buckwheat. The production cost of a quintal of grain in this period fell from R8.91 to R7.02, while profitability doubled.

In a word, no one has to convince himself in favor of buckwheat here. Here would be responsibility for the fate of this primordially Russian crop and proprietorial perspicacity, what is more, on the part of some leaders and specialists, particularly of loss-making and unprofitable farms of Siberia and the Far East. And the economy of the kolkhozes and sovkhozes would be righted and a specific contribution would be made to reinforce their area's food balance.

The experience of many progressive farms persuades us that the creation for buckwheat of successful nourishment and moisture-supply conditions, given the location of sowings thereof following sound predecessors, application of the

proper system of basic and presowing soil preparation combined with the inhibition of snow and thaw waters and the application of organic and mineral fertilizer in a complex with other agrotechnical methods, will always reliably ensure high stable harvests.

It should be mentioned, to be fair, that merely a desire for realization of the outlined plans is not always sufficient. Some farms have long had the intention of sowing buckwheat by the wide-row method, but there have been no special sowing machines, and the attempts to redesign with their own powers the available sowing units are not producing tangible results as yet.

Many additional concerns arise connected with the organization of harvesting operations. The point is that it is necessary for the high-quality threshing of the buckwheat swaths under normal conditions to reduce the speed of the threshing drum to  $600 \text{ min}^{-1}$  and in dry weather to  $400\text{--}450 \text{ min}^{-1}$ . The "Niva" combines do not lend themselves to such an adjustment. Many specialists noted in our conversations that the farms need, like air, wide-cut reapers. Here, they claim, is tremendous potential for an increase in labor productivity in harvesting the valuable crop.

A number of pressing questions connected with increased marketability of the buckwheat grain was raised also. They again basically boil down to provision of the farms with equipment. Take just the special grilles with the triangular mesh for the grain-cleaning machines, of which there has long been a shortage on the kolkhozes and sovkhozes. Many of them have entire highly productive grain-cleaning complexes (what a giant compared with the notorious grille!), but when it, this grille, is lacking, there can be no question even of increased marketability of the grain.

The kolkhoz farmers earned high payment in kind last year on certain farms of Altay, Omsk, Novosibirsk and other oblasts. But even this was not without its problems: how to cultivate buckwheat if throughout the neighborhood a hulling mill is not to be found in a month of Sundays. This is simple equipment, not intricate, but manufacturing it would seem to be a complex business. Of course, buckwheat can be replaced by money, but you cannot make porridge out of it!

In a word, more than enough technical questions have accumulated for the Siberians and Far Easterners. I would like to see our readers receive a reply to them on the part of the higher authorities, particularly the USSR Ministry of Tractor and Agricultural Machine Building.

Siberians are also worried particularly by the varieties of buckwheat. A considerable amount is seemingly being done for there to be a sufficiency of them. In the current year alone in the country as a whole seven new varieties are being zoned, and the geographic range of a number of varieties of buckwheat which are already being used in production is being expanded. But what has been cultivated specially for Siberia and the Far East? After all, no one needs to have it explained that the conditions for the cultivation of this crop in, say, Altay Kray and Donetsk Oblast are not entirely identical. Yet the Aromat variety, which it is currently planned to zone there, may, seed

breeders of the All-Union Scientific Research Institute of Leguminous Crops and Groats believe, correspond to the conditions of the two entirely different zones. Is this not why such varieties do not always adapt well to Siberian soils and are viewed by certain kolkhoz and sovkhoz specialists cautiously and warily. And, perhaps, why they are reluctant to part with the "old-fashioned" Bogatyr variety, which became obsolete long since, it would have seemed, but which in the past was on a par in terms of yield with wheat and other grain crops.

Dozens of years ago the seed breeders did indeed endow this variety with such Herculean strength that even now it is in no hurry to quit many Siberian fields. While in a neighboring republic--the Kazakh SSR--this variety alone is still cultivated. Such "old-timers" are barely to be found today among all the existing varieties of buckwheat. More's the pity....

Perhaps the region lacks its own scientific forces for this purpose? No, they are perfectly sufficient. Five seed-breeding centers and a number of zonal institutes and experimental stations engaged in breeding function from the Urals to the Pacific. Thanks to their purposeful scientific quest, splendid cereal varieties have been created recently, but buckwheat has been forgotten. Use is not being made for this purpose of the scientific potential of the Siberian agricultural VUZ's, which have wound down breeding work.

Of course, this process can be controlled, the more so in that the Siberian Agricultural Scientific Research Institute has a breeding center. Its leader, K.G. Aziyev, simply referred in our conversation to the fact that of the groats their scientific subdivision deals only with millet, while buckwheat is the province of the Novosibirsk people. But the situation is practically the same in Novosibirsk Oblast also.

Why not take advantage of the experience of the pooling of efforts in seed breeding which is already available. For example, the creation of new varieties of buckwheat for a vast region incorporating the southern Non-Chernozem zone, the Central-Chernozem belt and the forest-steppe of the Ukraine has been under way successfully since 1976 in conjunction with the seed breeders of the All-Union Scientific Research Institute of Leguminous Crops and Groats and the Kursk, Orel and Sumy agricultural experimental stations on the basis of a cooperation agreement. Practical results were obtained and theoretical generalizations were made in a short time here. Incidentally, the Aromat and Nektarnitsa varieties, which have been accepted for cultivation in Altay Krai and Novosibirsk Oblast, are the fruit of their joint efforts.

The well-known Russian agronomist and commentator A.N. Engelgard quoted the following utterance in his "Letters From the Countryside" (1885): "People know exactly how much can be made from what kind of food and what kind of nourishment suitable for what kind of work. If you eat cabbage soup with corned beef and buckwheat porridge, you will shift, for example, a cubic meter of earth. Substitute ground barley porridge for the buckwheat porridge, and you will handle less than one-eighth...."

There is hardly anything that may be added to these words, particularly for Siberians and Far Easterners, who have to live and work under severe climatic conditions, where "cabbage soup with corned beef and buckwheat porridge" are indeed needed. But, as we can see, at different stages of operation and management the humble crop still has its ill-wishers and nonperformers. And for this reason the readers' mail, which keenly senses the sorest spots in the economy of our vast region, is not drying up on this subject.

Comment by G.I. Beglov, deputy chief of the RSFSR Ministry of Agriculture Main Farming Administration

The principal task of agricultural production is providing the population with diverse food products, a place of considerable importance among which is assigned buckwheat. Buckwheat has high alimentary and dietary properties. At the same time it is a good nectariferous plant and a valuable predecessor of agricultural crops, exerts a positive influence on the general standard of farming and has a capacity for assimilating phosphoric acid from difficultly soluble compounds.

Currently the kolkhozes and sovkhoses possess everything necessary for farming to be conducted on a high level. Each farm has a strong material-technical base and the necessary quantity of fertilizer and plant-protection agents and is provided with highly skilled specialist personnel. A number of government decrees has been adopted aimed at stimulating the production and sale of buckwheat grain to the state.

Many kolkhozes and sovkhoses of different soil-climatic zones of the republic have accumulated considerable experience of the cultivation of buckwheat grain. For example, farms of the Tatar ASSR's Aznakayevskiy Rayon steadily obtain high harvests (9.3 quintals per hectare on average in 4 years of the current 5-year plan) and are increasing the rate of the production and purchases of the grain of this crop. Many rayons of the Bashkir ASSR, Kuybyshev Oblast, the Non-Chernozem zone and Altay and Maritime krays have high indicators.

At the same time, however, the production of buckwheat in the republic as a whole has been causing serious concern in recent years. Procurements thereof for state resources are being secured only 50 percent. Yield remains low and unstable.

Average annual buckwheat grain production in the 4 years of the current 5-year plan constituted for the RSFSR as a whole only 52 percent of the plan. And the article "Who Will Help Buckwheat?" prepared by the journal's editorial office is absolutely correct to emphasize that a reason for the current situation concerning buckwheat production and procurements is insufficient attention to its cultivation on the part of the local agricultural authorities and many kolkhoz and sovkhos leaders and specialists. There are also questions of the farms' insufficient provision with special equipment for buckwheat cultivation.

What is the way out of the current situation? We believe that it is necessary first of all to raise the personal responsibility of kolkhoz and sovkhos leaders and specialists for fulfillment of the state plans and ensure strict

observance of the techniques of cultivation and harvesting of the crop and its location per the best predecessors in accordance with scientifically substantiated cropping systems. It is essential on each farm to observe the specified times for the sowing and harvesting, perform the sowing with high-grade seeds and implement a set of measures to combat disease, pests and weeds. Much remains to be done to accelerate the introduction in production of progressive cultivation techniques with reference to actual soil-climatic conditions.

It is also necessary to concentrate the buckwheat sowings and assign all the sown areas to mechanized links paid for the end result.

This work is being performed currently in the oblasts, krays and autonomous republics, but not as assertively as the situation demands.

This article will exert, we believe, a positive influence on the solution of the problem of an increase in buckwheat grain production and fuller satisfaction of the population's buckwheat requirements.

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## TILLING AND CROPPING TECHNOLOGY

### MAXIMUM BIOLOGICAL POTENTIAL FOR GRAIN CROPS

Alma-Ata SELSKOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 9, Sep 85 pp 11-12

[Article by N. Glinyanyy, candidate of biological sciences: "Helping the Arable Land Gather Strength"]

[Text] The grain farmers of Kazakhstan are successfully assimilating scientifically-based zonal farming systems and an intensive technology for raising grains based on increasing the effectiveness of utilizing clean fallow, organic and mineral fertilizers and herbicides. In the final analysis all of this increases grain yield. The author of this article, N. P. Glinyanyy, discusses the creation of favorable conditions for the maximal manifestation of biological potential at the stage of seed germination, which also has a positive effect on the development of the harvest.

Of all grain crops, spring wheat is most demanding of the soil and temperature. Thus, in order to raise large yields and to obtain full-value grain in the republic's dry regions, a determination of the schedule for sowing seed is of priority importance. Spring wheat shoots (as well as shoots of other grain crops in the first group) find themselves in the most favorable environment precisely during early sowing. The optimal amount of moisture and low temperatures during this period are irreplaceable factors within a complex of conditions that are essential during the early phases of plant growth and development. With late sowing, when temperature rises and a moisture shortage is experienced, plant development slows. Critical phases of the life cycle such as blooming and grain formation occur during the hottest and driest period. The result is a low harvest and puny grain.

The data obtained during the 1950's in the experimental fields of KazGU [Kazakhstan State University] and the KazPI [Kazakhstan Planning Institute] agrobiostation and later confirmed under production conditions shows that low temperatures are vitally important to shoots not only prior to but also significantly after shoot formation. This is why early sowing is one of the methods for regulating the pace of plant growth and development with the goal of increasing productivity. This was confirmed by our long-term experiments with the Kazakhstan variety and over 100 varieties of spring wheat from VIR [All-Union Scientific Research Institute of Plant Growing] selection. With

late sowing, the pace of development in plants is so much more rapid that the growth pace that by the end of the vegetative period they yield only single weak stalks. Even under the best of circumstances they are inferior in productive bushiness to plants that are sown early.

F. M. Kuperman showed that for growth, plant roots require a lower optimum temperature than above-ground organs. This conclusion is confirmed by our tests on the germination of spring and winter wheat seed. The roots of shoots from this seed demonstrate a clearly manifested growth even at zero degrees, whereas in the stem rudiment it is not manifest externally. This physiological characteristic of sprout roots of spring wheat is of great adaptive significance--with a relatively low temperature young plants establish good root systems prior to the onset of the period in which soil and air become dry.

By means of numerous experiments we have been able to single out and study another group of morphological-physiological transformations of anatomic features in the very embryo of spring wheat shoots which "begin to sprout" under conditions of low temperatures and optimal moisture. It is commonly accepted that bushiness begins in wheat after the formation of 3-4 leaves above the surface of the soil. The great biological role of tillering of cereal grasses in their struggle for existence and the no less important economic significance of this phenomenon are well known. It has long been time to make a multi-faceted study of this phenomenon.

An analysis of research results on the directed transformation of spring wheats into winter wheats made us doubt the correctness of the aforementioned concepts as regards the time tillering begins in a given crop. We began to study anatomic-morphological changes occurring in the germ of seed germinating at temperatures of 0 to 8 degrees. It has been established that additional buds (vegetative cone), which can be seen under a microscope, develop one by one in the axils of embryonic leaflets. Some authors note that "sleeping" buds in the germ of cereal grasses are discovered prior to germination. In extensive research on wheat grain (including in laboratory studies of students in senior courses of KazGU and KazPI) reproduced in the KazNII [Scientific Research Institute] of Farming and in suburban kolkhozes and sovkhozes, additional vegetative cones were not discovered a single time even 36-48 hours after soaking. They begin to appear on the 8th-10th day after the start of germination of buds at low temperatures. On the 25th-30th days 2-4 additional buds were discovered in the germ of spring and winter wheat. During this time the length of the coleoptile in the sprout reaches only 3-7 millimeters.

Additional vegetative cones, which form gradually in germinating buds, are the basis for tillering in wheat plants. It is understandable that this foundation is laid by means of the endosperm of seed, which comprises 97 percent of its weight.

Long-term observations have enabled us to establish that in the early phase of the life cycle low temperatures are needed by wheat not only for vernalization ["yarovization"] but also for carrying out other processes (in addition to those mentioned above). Low temperatures slow down respiration and the

reserves of nutritional substances in endosperm are consumed more efficiently (for the purpose of establishing additional buds and of developing a root system) than when temperatures are higher. This explains the fact that spring wheat plants that are sown late hardly bush out. In studying spring wheats on test fields and under early-sowing production conditions the following is always observed--young plants do not fully use up nutritive substances from endosperm by the time of shoot formation. But in plants that are sown late endosperm is more depleted when this phase is reached.

Data from different test variants speaks of the fact that spring wheat shoots still vitally need additional organic nutrition from those very remains of endosperm for some time after shoot formation as well. Germinated young wheat plants still cannot carry out photosynthesis intensively enough to fully supply themselves with organic food. They experience a radical change in their lives, which is referred to by the author as "a period of adaptation toward independent photosynthesis." During this period they still need maternal food, which is what the aforementioned endosperm remnants are in the full sense of the word.

The intensity of the consumption by spring wheat shoots of nutritive substances from endosperm depends first and foremost on temperature. If temperatures are elevated these nutrients are used up (due to intensive respiration by plants) prior to the end and sometimes before the beginning of the period of adaptation of the plant to independent photosynthesis. This results in the starvation of young plants, which has an extremely negative effect on all their further development and on the entire harvest.

Early sowing of early grain crops cannot always be carried out following an early and maximally-compressed schedule, usually because of the weather. For this reason, we need an agrotechnology that will enable us to decrease the negative effect of forced delays in sowing, to create conditions under which plants can best utilize the beneficial low spring temperatures and moisture during the first phases of life and that will ensure that seed will be in a biologically-active state immediately upon placement into the soil. We achieve this by means of presowing soaking of spring wheat seed 24-36 hours before sowing. On the test plots of KazGU and KazPI this method has been tested on numerous occasions using many varieties of spring wheat. The method is easily assimilated and requires an extremely small expenditure of labor, but its practical effectiveness is relatively high. From shoot formation to the end of vegetation, plants that develop from seed soaked prior to sowing surpass plants growing from seed sown in dry form. As a result, wheat productivity on test plots increases by 7-9 percent in comparison to the control.

This method has been successfully utilized by the author under production conditions using the Eritrospermum-841 variety.

The soaking of sowing material is a simple method--grain is set out in a 15-20 centimeter layer in a facility with a paved floor and is watered by watering cans with sieves. It is then carefully mixed using wooden shovels. One to 2 hours later it is raked into a pile and covered with a tarpaulin. The seed

must be placed into the soil within 24-36 hours. The sowing rate is the usual one for this crop (based on a calculation of the quantity of dry seed).

Some may accuse the author of appealing for a return to a method of presowing vernalization of seed. I will say immediately that this is far from the truth. I know from experience that vernalization is a cumbersome and risky method. In addition, the author reached the conclusion that spring wheat has time to undergo vernalization if it is sown in cold soil in a timely manner. This is why a method was worked out for sowing spring wheat using soaked seed, which provides plants with the opportunity to maximally utilize favorable conditions, to demonstrate their biological potential, to gather strength at an early phase of development and in the final analysis to create a good harvest. I recommend this method first to creatively-inclined agronomists-experimenters. Experimenting on a broad scale will bring out the effectiveness of innovations in a particular region. Others will follow the experimenters.

Any reserve for increasing the productivity of grains must be utilized to the maximum.

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TILLING AND CROPPING TECHNOLOGY

BRIEFS

NEW UKRAINIAN BUCKWHEAT--Packages containing seed for new buckwheat varieties were sent to farms in the Russian Federation and the Ukraine by specialists from the Scientific Research Institute for Crop Production and Animal Husbandry in the Western Regions of the Ukrainian SSR. This season Ukrainian varieties of buckwheat will be planted on more than 300,000 hectares. [Text] [Moscow TRUD in Russian 20 Feb 85 p 1] 11574

TETRAPLOIDAL BUCKWHEAT--Plant breeders at the Verkhnyachka Selection Station and the Cherkassy Agricultural Experiment Station have offered the Oblast's farmers the "Bolshevik-4" buckwheat variety. One of the first tetraploidal varieties created in our country, it has already been regionalized. In addition to its high potential yields, it has a number of other valuable characteristics: groat [krupa] output is 73-78 percent and is distinguished by its good taste qualities. Similar to other tetraploidal varieties, the "Bolshevik-4" is resistant to lodging and shattering and when windrowed it losses less seed. This tetraploidal variety is also more resistant to cold after planting and during sprouting, making it possible to plant it at an earlier date. [Text] [Moscow SELSKAYA ZHIZN in Russian 17 May 85 p 3] 11574

OREL BUCKWHEAT TECHNOLOGY--Farmers in Orel Oblast have switched over to a progressive technology for growing buckwheat. A third of all crops are planted in widely spaced rows. This makes it possible to use the freed equipment everywhere and to do the work within optimal times. [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 31 May 85 p 1] 11574

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